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The Transmutation of a Residence Street, Resulting in Another Solution of a Utilitarian Problem by Architects

Probably never before has a popular mechanical invention had such a potent influence in diverting a prominent street from its original purpose and, incidentally, influencing the development of a pertinent style of architecture as has the automobile in transmuting Michigan Boulevard, in the city of Chicago, from a residence to a business street.

Ever since Chicago became a city of importance, and that was within the memory of men still living, Michigan Avenue has been a street to be proud of. In its earliest days, say, between 1850 and 1870, its northern extremity was noted as the favorite location for the residences of Chicago's wealthiest citizens, and it was improved in this manner from South Water Street on the north to Sixteenth Street on the south. From Randolph Street to Park Row its east side, bounded by a long and narrow park, afforded an unobstructed view of Lake Michigan from the opposite side, and this was an additional attraction which led to the erection of fine residences on its west side. After the Chicago fire in 1871 the avenue was set apart as a boulevard and turned over to the government and regulation of the South Park Commissioners. Then it was gradually rebuilt with business structures and hotels as far south as Congress Street, the part of it on which all the buildings had been destroyed by fire, and the erection of an even better class of residences was continued up to recent years as far south as Thirty-ninth Street. South of that point most of the buildings erected within the last ten years are apartment houses of the better class. The whole boulevard for a distance of six miles was in this condition until about five years ago, when few private residences have been erected.

Gradually within twenty years past the old dwellings and cheaper business buildings have been replaced as far south as Twelfth Street by still better commercial buildings and great hotels, which are famous, not only in Chicago, but throughout the world, and this has been the result of the gradual expansion of the business center of the city.

But another change has come over this street within the last five and mostly

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FIG. 1. AUTOMOBILE ROW.
West Side, from 14th to 16th Streets, Michigan Boulevard, Chicago. Various Architects.

within the last two years. This was to be expected, but not in the way in which it has occurred. It is a well established fact in connection with the expansion of all American cities that retail business always follows and absorbs property in the direction of the best residence streets. It had been anticipated that something of the kind would occur in Chicago. But Chicago is really three cities with physical lines of separation, surrounding a central congested business district common to all. Which way the "cat" would first jump no one knew.

But the automobile has settled that question as it has not elsewhere. Michigan Boulevard. since the "auto" came into extensive use, with traffic teams forbidden and its splendid bitulithic pavement, has been the longest and best automobile course in any city of this country. At the present time this is so emphatically the case that a horse is seldom seen on it. Since the recent heavy snows, which have accumulated to a depth of at least eighteen inches before being packed, the whole roadway is a series of grooves and chain prints, with scarcely ever a hoof print; for even sleighs have disappeared. The dealers in machines have from their first appearance used the Boulevard for trying them out for customers. From this custom their attention has been attracted to its advantages as a location for their exhibition buildings and offices. It did not take long after one company erected a large building for the purpose, on the corner of 14th Street, before others sought locations. But the street was nearly all occupied by costly residences, and it was not easy at first to procure building sites. The property had been held at a high price always for residence purposes; but owners soon yielded to the demand at a higher price than formerly, and some tore down their houses and built stores, which were quickly rented. The "auto" people from all over the city then began to besiege the property owners for more sites and buildings, and the natural consequence was a "boom" in the prices of lots. Now nearly all the property for two miles is "for sale" at boom prices; many of the old families are in a panic to get away from the street; some because they want to sell at high prices, and others because they are sensitive to the association with trade. This state of affairs exists from Twelfth

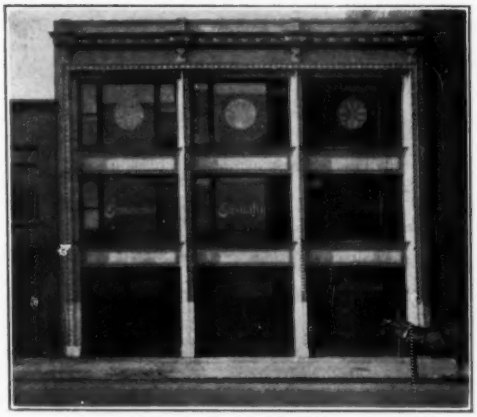


Fig. 2. Continental Casualty Co., Nos. 1208-10-12.
Jenney, Mundie & Jensen, Architects.

Street south to Twenty-sixth Street, and scattering properties have been sold along the Boulevard as far south as Thirty-ninth Street, four miles from the business centre of the city, where a large store and factory combined is to be erected.

The building of residences on Michigan Boulevard is at an end, and it is not likely that any more buildings, except apartments, will be erected south of Thirty-ninth Street, which twenty years ago was the southern limit of the city. What with the use of the roadway by the thousands who now go up and down town between house and office or store, the shopping crowd that is too dainty to put its feet on the pavements and the "auto" dealers "showing off" their machines, the Boulevard is a lively street, with a continuous stream of machines going both ways at all hours; sometimes two abreast, and at all speeds. It is no easy matter to cross it safely at any time; but this all means "business" and, now especially, business for architects and builders. The Park Commissioners, where the Boulevard passes Grant Park, have widened the street thirty feet, and divided the driveway by long "isles of safety" and a row of lamps in the center. This is where the greatest rush occurs in front of the hotels and theatres.

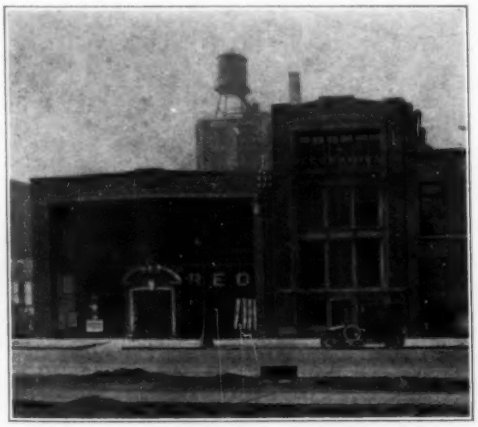


Fig. 3. The Reo (on left) and Spierling & Linden, Decorators (on right), 1218-20-22.
Howard Shaw, Architect.

The erection of "auto" buildings is now mostly seen between Twelfth Street and Twenty-sixth Street, a distance of about a mile and a half. Within this space have been erected within the last two years from thirty to forty new buildings nearly all for the auto business and all with from fifty to one-hundred feet of frontage. They are two stories, three stories and four stories high above the street grade. Most of them are three stories and some are seven and eight stories high. A very few other kinds of business are interspersed between them, but high class retail business has thus far taken up only the properties north of Twelfth Street fronting Grant Park near the new hotels. Here the high fireproof building is in evidence, and it will not be long before the whole lake frontage is built up with such structures where it is not now so occupied.

The development in architectural design as seen in these automobile buildings is the main occasion for this article. They have furnished the most recent problems for solutions by Chicago architects. The carriage business, heretofore so extensive, has not furnished any material precedents for them. For the display of the goods and the maintenance of any considerable stock, they require very large show windows, and large space on a level with the street. Fortunately the lots on Michigan Boulevard are very

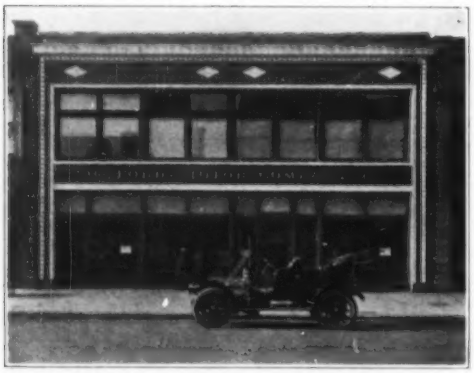


Fig. 4. Ford Motor Co., 1144-6. Christian Eckstorm, Architect.

deep, about one hundred and eighty feet. This makes it possible, besides the show room in front, and the office on the second floor, to have a large one-story extension running to the alleys and large enough, without obstructing columns, to demonstrate the operation of machines without going outside. The use of so much gasoline indoors necessitates that these buildings be fireproof and thoroughly ventilated. It is also necessary to have a place for washing the machines after trial on the road and a small machine shop for quick repairing.

New problems in plan naturally suggest new problems in design; because of the difficulty of using the old conventional details. Freedom from the old precedents in design is the natural consequence. If it appeared that only a few architects had given their imagination more play than the dictates of discretion had suggested, there would be no occasion to consider the incident important. But it is facts that we are dealing with, and the fact that so many of them have, without concerted action, solved these problems in so nearly a similar manner only goes to show that if many minds work in concert, without premeditation it must be the best evidence that there is a good reason for it, and the question therefore arises: Do these buildings portray a natural evolution in design?

From the illustrations to be given it will be possible, perhaps, for the reader to realize whether or not the rational treatment of the designs for these buildings is the right one. It is not to be expected that many of them will betray beauty of form or color—they are mainly utilitarian. But on account of their location on a street notable for very good architectural improvements it is natural that designers should have sought to make them more attractive than purely utilitarian factories and warehouses. Therefore, it is here that we must look for the first development of a feeling to make them at least more than ordinary; to introduce decorative detail, not inconsistent with the service to be performed by the materials employed. If this is done consistently it is evident that here we must look for the crude beginnings of a new architecture. And if it can be so called it is not to be praised too highly, neither is it to be condemned rashly, because it is new, if the effort is honest.

These buildings, while built substantially, will not be required for the present usage many years. But they are well adapted to be given over to the uses of

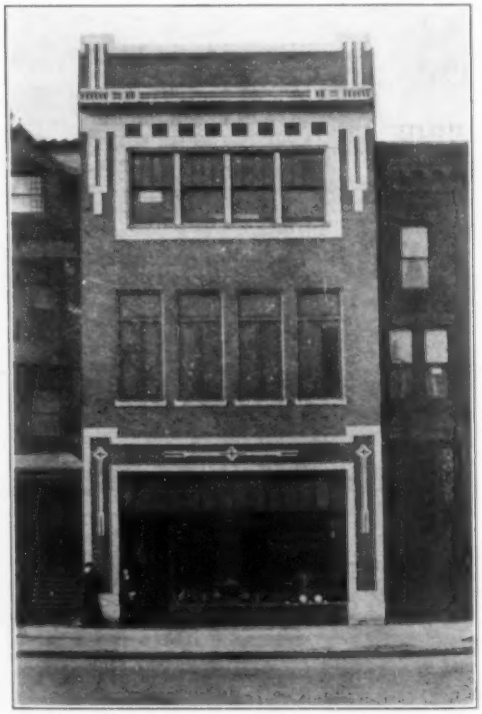


Fig. 5. The Moline, 1508.

retail trade, which in due time will invade the same locality demanding generous show windows and large floor spaces. As land values mount upward they will be displaced by larger and higher buildings and will be regarded as merely stepping stones in the evolution of a better and, let us hope, more beautiful architecture than we have yet produced.

A few of these new automobile sales buildings have been selected for illustration. Figure one is called "Automobile Row," because from Fourteenth to Sixteenth Streets, a distance of two city blocks, all the residences on the west side of the street except three have been torn down and replaced by stores. All of these are either sales buildings for automobiles or for appliances connected with their manufacture and equipment. None of them has much architectural prominence. The majority are only two stories high and their temporary nature is evident. Yet many of them have been carefully designed. They are by various architects.

The other illustrations following are of buildings of greater prominence and value, being interesting mainly as showing the evolution of design. They represent the medium class which we can now see in their completed or nearly completed state. While this is being written many more residences are being torn down to be replaced by business structures. The destruction has not spared one of the larger churches on the Boulevard, located at the corner of Twenty-third Street, while excavations are in progress at many points, and work has been commenced on other buildings which will excel those here illustrated in size and cost and possibly in design. One

FIG. 6. THE MAXWELL-BRISCOE.
Northeast Corner 18th Street. W. E. Walker, Architect.

Fig. 7. Locomobile, Southwest Corner 20th St. Jenney, Mundie & Jensen, Architects.

project contemplates a building the whole length of a block and twelve stories high. But that is a matter for the future.

The titles given to the illustrations, for the sake of brevity, do not mention Michigan Boulevard, but the buildings all front that street. The street numbers only are given, and they appear in due order from north to south, one hundred numbers being apportioned to each block. Only two of the illustrations show buildings not devoted to the automobile business, Figure 2, which shows the new building for the Continental Casualty Company, of enameled terra cotta with a gray brick border, by Jenney, Mundie & Jensen, and Fig. 3 which shows besides the Reo Building the house of Spierling and Linden, decorators, both by Howard Shaw.

Nearly all of the automobile stores are of enameled terra cotta in tints either white or buff, and different kinds of pressed or paving brick. The Maxwell-Briscoe Building (Figure 6) by W. E. Walker, is faced with "wire cut" brick of a deep brown color, laid with scraped out joints. A very lively effect comes from the fact that these bricks are of uneven color. They are preferred for that reason. The enameled terra cotta is of a decided buff color, and makes an excellent contrast, while the modeled ornament over some of the windows is very effective.

Fig. 8. The Studebacker, Northwest Corner 21st Street.
W. E. Walker, Architect.
(Showing method of concrete construction.)

Fig. 9. The Mitchell, Nos. 2234-6-8.
Jarvis Hunt, Architect.

Figure 8, showing the Studebacker building, which is to be devoted entirely to the sale of automobiles, and also de-

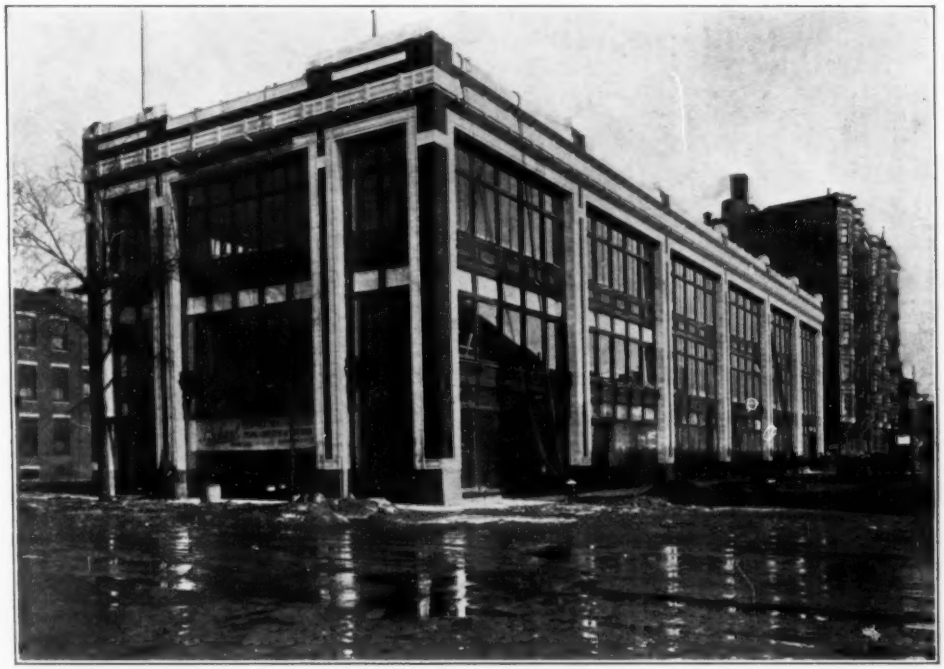


FIG. 10. THE PACKARD-DETROIT.
Northeast Corner 24th Street. Albert Kahn, Architect.

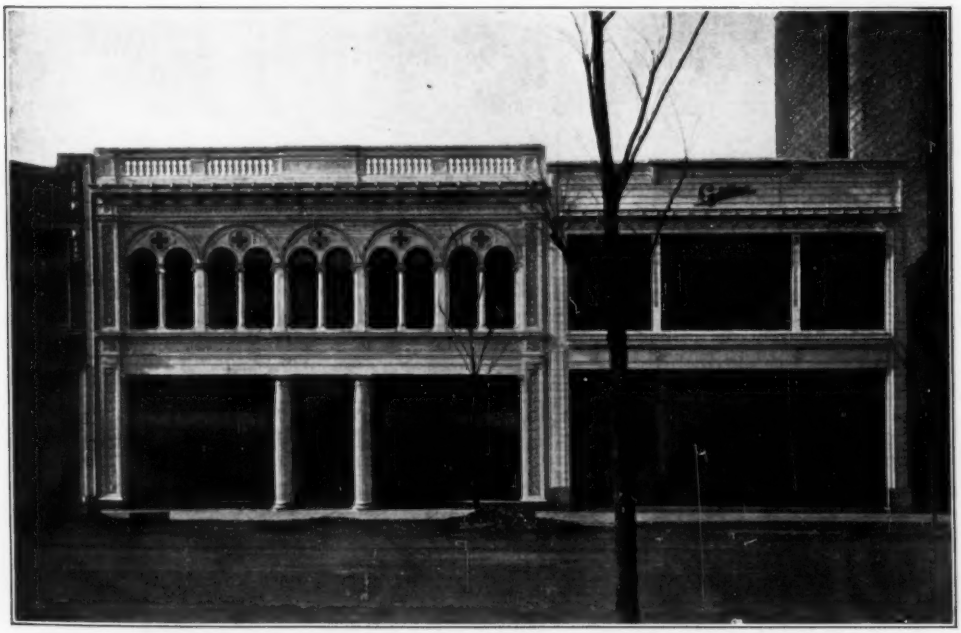


FIG. 11. THE DETROIT ELECTRIC (ON THE LEFT), NOS. 2416-18.
George Mason, Architect.
THE CADILLAC (ON THE RIGHT), NOS. 2412-14.
Jenny, Mundie & Jensen, Architects.

Fig. 12. The Pierce, Nos. 2420-22.
Jenney, Mundie & Jensen, Architects.

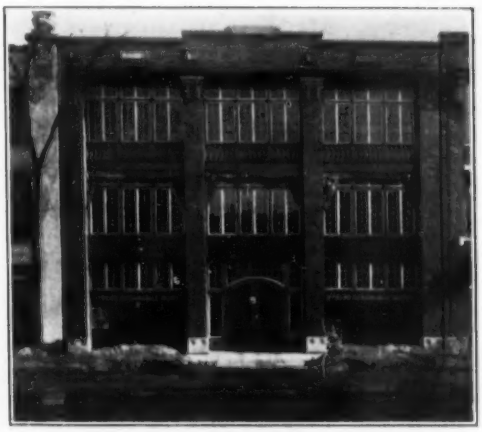


Fig. 14. Nyberg, Dealer in all Makes, Nos. 2435-7.
Howard Shaw, Architect.

signed by Mr. Walker, is very different. It is introduced to show the concrete construction, which is faced on the outside with the same "wire-cut" bricks. This building is to be seven stories high.

Figure 11 shows two buildings faced entirely with enameled terra cotta. The Stearns Building (Figure 13) is faced with enameled bricks, the color effects being produced by inlays of stone. Figures 14 and 15 show effects produced mostly with paving bricks and cut stone. No. 14 is a combination repair shop and sales room and No. 15 is a taxi-cab garage. The material and design in these last two cases are appropriate to the purposes of the buildings, but not to the character of the street.

The most original and attractive of all these buildings is Figure 16 by Holabird & Roche, for the Duffy Automobile Company, which is not quite completed. It is of gray pressed brick and white enameled terra cotta. It should not be called Gothic, for it is not like any building ever erected in the Gothic period. The treatment of the corners and the cornice, which serves to unite all the angles of the building, is very effective. It may have been suggested by Italian models

Fig. 13. The Stearns, Nos. 2431-33.

Fig. 15. A Taxicab Garage, Nos. 2441-43.
Robert F. Smith, Architect.

and yet it is not Italian. The cornice is more English than Italian. The brickwork it will be noticed is one unvaried surface, serving to make the window tracery all the more effective by contrast. And this tracery is not copied from any English model. The plainness of the window openings also serves by contrast to accentuate the tracery. It will be noticed also that all the windows run from floor to ceiling, leaving no room for transoms. This will, therefore, fittingly conclude the list of illustrations.

Peter B. Wight.

FIG. 16. DUFFY AUTOMOBILE CO., NORTHEAST CORNER 25TH STREET.
Holabird & Roche, Architects.

Thought and Expression in Architecture

A recent inspiring article in this magazine* has again pointed out some of the difficulties of our schools and to the necessity for thought in and about our architecture. The immensity of the opportunities confronting the profession do, certainly, call for profound reflection, perhaps especially with regard to its educational problems.

Architecture ranks among the fine arts because it is an art of expression. It goes without saying that in the development of resources in the way of materials and structural systems, and in the arrangement and expression of the useful areas of a composition that the architect of the present day has far surpassed all his predecessors. In one respect, however, architects and the schools in which they are trained have obstinately refused to make progress. It seems almost as if every arrangement had been made in the schools and in the offices to exclude and prevent progress in this direction. There is a rumor to the effect that, in architecture, where there is a change of material there should be a change of form; but the student is nevertheless taught to design by imitation. He is encouraged to imitate architecture in materials of which he knows nothing. He studies from Vignola, a book that knows no materials. He will probably not use materials precisely similar to any of those of the architecture which he analyzes in his historical studies. He knows nothing of the processes by which those materials were shaped and put in place. And he is not taught in designing to consider the materials and processes in and by which his buildings will later be executed, but always and only to compose. Now, is it important or is it not that every student of design should be trained in that phase of his art which gave to the buildings of the past that particular virtue which alone our architecture lacks, the expression of materials and structural systems?

The development of this particular expression constitutes the opportunity of the architectural world. Will schools and architects step forward and enter into it, or will they wait again for the compulsion of the client? Planning has improved because of the demands of the client. The tendency to ultra-conservatism was as strong in this respect as it is in façade. Its irrational effect, wherever it exists, is amusingly illustrated in the minute windows of certain modern English houses, far too small, as the whole civilized world knows, to render the interior upon which they open wholesome for human habitation and still foisted upon clients who are convinced that, although they cannot understand it, there is some mysterious virtue in the appearance of a porthole in an acre of blank wall. Progress has been made because people, all the people, and the architects last and most reluctantly of all, saw, for instance, in dwellings, that they must have, instead of mediæval habitations, light and air and privacy and sanitation. The client has required, also, the adoption of steel and concrete. These changes from more historical materials have played havoc with cherished proportions, but have shown again the truth of the ever new and startling fact that there is no certain set of proportions inherently more pleasing than some other set that can be devised. At this point the demands of the client have, for the present, ceased. Having been responsible, really, for all the progress that has been made, in his role as the originator of all the programmes—that part which the architect does not initiate—he has given up trying to understand what the architect does with the surfaces of his buildings. He knows that the result is expensive, that he ought to like it, and he conscientiously tries. But it is going to appear to the educated public, presently, that they are as hardly used

*Drawing, Designing and Thinking, W. R. Ware, September, 1909.

in a design which arrogantly refuses to explain itself or in one boldly presenting a false and borrowed explanation, as they are in the case of the unquestionably pretty window which just as certainly fails to admit the light and air of which there is so much need. The layman understands motors, and literature, and music, and is presently going to take the safe ground that if architects really understand what they are about and take any pains to make themselves clear, he also, the person of average intelligence, can understand their productions. From the division of interest in the public between the hand-organ ballad and the grand opera, it is clear that appreciation of an effort to be understood on the part of the designer would not necessarily be universal; still, from the eagerness with which much twaddle which professes to convey information with regard to architecture is now eagerly consumed, it is clear that there are many keen for knowledge. The architects who add themselves to that select number who are now producing sane and sound, and beautiful architecture, clear and comprehensible, are those who will contribute most to that fabled new architecture of the future.

First and foremost in the comprehension which the layman so earnestly desires must come the notion that an architectural composition is a unit, just as is a composition in music, or in language, or in sculpture, that in this unity every part must be relevant, must have some function to perform. If a part is present which performs no palpable function, or if its function is to make clear, and it is expressive of something beside the structure or the subject in hand, it is out of place, distracting; the whole in which it is contained is deficient in unity. The function of the parts in a composition may be structural, emphatic of structure, or emphatic or descriptive of the ideal purpose or character of the whole. The term decoration is not used, because decoration either falls within these definitions or is irrelevant. The compositions of Greece, Byzantium and mediæval France will, for the most part, endure analysis without the emergence either of redundant or meaningless parts, or parts which have a meaning at variance with their actual construction.

But how can this proposition, excluding, as it does, so much of the architecture of the past, be well founded or acceptable? There should be no more hesitation in accepting such a conclusion than in acknowledging the authority of an English grammar and dictionary that deny the complete excellence in spelling and construction of pretty much everything before the middle of the last century. No one is outraged by the dictum, in letters, that although Shakespeare wrote with monumental effect, employing certain constructions, that some of those same constructions are impossible to a well-educated person now-a-days. On this same ground, there can be no objection to the statement that architecture ceased to be alive when it no longer quivered with expression in every part, and that it will never again come alive until every designer gives up copying expressions and says what he has in his own mind.

The codification of the grammar and rhetoric of this art are inevitable in the near future. Not that there are not already lengthy discussions of the subject-matter of architecture with a few valuable references to guiding principles of perfectly general bearing. These books are certainly of great value, but they endeavor to set down definitions of those parts of the matter of architectural expression which correspond to the ideas and motives of the written work. It is as if the rhetoric should, instead of discussing the manner of expression, take up seriatim all the subjects that the student might ever wish to argue or expound, giving a detailed treatment of each. One task is as possible of satisfactory completion as the other. What is more essential to continue the figure, is to explain the etymologies of the architectural words. This study will immediately show, first, how unfitted the old words are to the meanings in which they are now used, and, second, the possibilities of combinations which will give new words for new meanings. With the single term Corinthian capital for

multiple structural situations in many materials, our vocabulary is as poor as if we were limited to the word chariot for all our horse-drawn vehicles, the motor car and the aeroplane. The recent development of the study of pure design makes possible this study, and, further, the investigation into the manner of expression in this art dissociated from the matter. This is, beside the development of his sense of beauty, what the student should be trained to extract from the monuments of the past in Europe. When the subject is squarely faced this is all. The forms of use of all the monuments, their position, measure and shape, are practically all different from anything called for by the programmes of our own day; and we have, beside, developed new and different structural systems. The effectiveness and beauty of the monuments are due to methods of expression which will be no less serviceable again. The subject of his oration the orator may commonly not choose. He is fortunate if it is one that makes an appeal to the emotions of his auditors on its own account. The greatest orators, however, have been those who were able, in the face of hostile demonstration, to win a hearing and sympathy and enthusiasm. It is true that not all of this ability is to be learned from books; but shall we deny him who wishes to follow in the steps of the great orator or to understand all his effect and power any assistance other than "Know what you have to do, and do it"?

Architecture must be considered, by the architect who practices it, to be either an art of building plus expression, or an art of building with the added requirement that the result should tickle the eye. In the latter case, it seems at first as if it mattered not what is done or how the effect is obtained, so long as it is pleasing, no consequence what the materials are, so long as the surface pleases. Certainly, then, there is no need of copying Gothic or Classic, Byzantine or Greek. These architectures are all different each from the other. Let us do something different also. We have the resources; and variations have their by no means unrecognized advertising value. There are, however, some limitations even in this case. The conception, whatever it is, must be capable of execution in the materials chosen. In the present state of cryptic mystification in which the architect holds the public, it does not matter that his vagary in brickwork costs more than a decent performance in stone, that an elaborate interior in plaster costs more than it would executed simply in marble, that a galvanized iron fantasy costs more than a plain statement in brick, for the public does not know that its money is being sunk fruitlessly in ignorant tribute to an intelligent past. The public is certainly finding out, however, that architecture is a pleasure to its designer and his fellows almost alone, to themselves almost meaningless; and that it was at various times past the easily comprehended pleasure of all who beheld it.

The day is coming when everyone will know that that single limitation, adaptation to material, is the philosopher's stone for architecture. The project must not only be executable, at whatever cost, but at a cost which remains within the limits of the particular material chosen, not rising to the expense of the next better material. Obviously, if the expense were to be so great as, for instance, to make stone possible instead of brick—and the client knew it—that better material would certainly have been chosen. With this limitation of straightforwardness and economy arise advantages to every designer seeking excellence and beauty, and who desires as well variety and originality. Originality has, for the most part, consisted in finding hitherto unused sources for imitation. The imitator is usually blind to the immense truth that that which is imitated was successful because it followed the law which he breaks in copying it. The copy, defying the material and structural system in which it is carried out, is but a copy. The classic example is good, because it is a simple, straightforward, characteristic use of the material and structural system in which it is executed.

On account of this simple but sufficient lack of adherence to right principle, architectural education, with rare excep-

tions, is in a blind alley. How many architects are there who know or care how terra cotta is made in such detail as to be able really to make a design in terra cotta, that shall not be simply stone, made small. How many know how stone is quarried and cut and carved and polished so as to be able or willing to take advantage of a single one of the new processes so as to intelligently and expressively and beautifully modify the forms of Classical antiquity and the Renaissance, in such a way that the very laborer in the stone yard will know the details to be fit to that material which he knows by heart? Are the students in our schools, again with rare exceptions, in any way to find out these things, or are they always and always taught composition and more composition? What is the sense of training the imagination in composition without ever setting it to work on the materials in which it must realize its dreams? Does the student of music study composition in moonshine, or the student of the piano execution on the violin, or the student of literature composition in architecture? There might be advantages in these exercises. In no art except architecture, however, does the student remain on moonshine to the end of his school studies; in the other arts a profound knowledge of the technique of each is required.

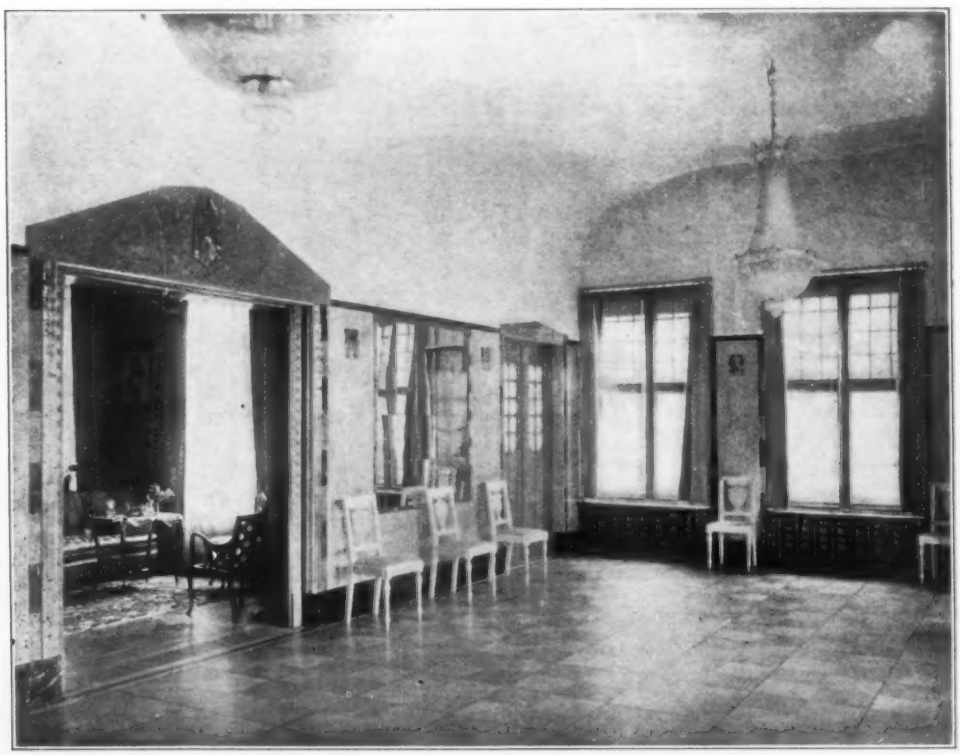
The technique of this art is not draughtsmanship. It is, in the first place, a knowledge of and ability to influence men. Out of the hands of men the architect receives his commissions, and into the hands of men he must entrust them for execution. He must be able to comprehend and sympathize with all the men with whom he comes in contact, to interest them, to persuade them and to command them. He must have business capacity without which few men long interest their fellows. He must be as capable in arranging a plan as possible. He must know materials and how to handle them. He must be able to draw well enough to explain his ideas to the client on one hand and to the contractor on the other. These abilities are placed in the order of their importance. The man who can handle men and who may be devoid of architectural training, is a satisfactory architect for a portion of the public. It does not seem to matter whether the ability is acquired in college or in politics or in a lodgeroom. This "ghost" architect, who is merely a business man, is a reproach to the profession. The way to keep him out is not to legislate against him but to make the profession inaccessible to him. As long as one set of draughtsmen, as well as another, can carry on its depredations in a happier past, so long will he be possible. A little more care on the part of one imitator than another is not greatly appreciated by the public who are equally perplexed as to the value of either. Only when the technique of the art is witnessed by the plain sense of every one to be a carefully trained ability to handle the materials with which it deals, to produce unmistakably and generally comprehensible effects with them, will its difficulties be recognized to be such as to disbar the unprepared. The composition and expression of the ideal forms of use, and the expression of materials and structural systems constitute the peculiar field of the architect. He must cover the whole ground, but here, although the layman must easily comprehend, neither he nor the "ghost" can follow a properly trained man.

The placing of the study of expressive construction at the beginning of our curriculum is at the bottom and root of all possible future progress in architecture. This step in certain schools marks the return toward that method by which the world's greatest architecture was achieved. In Greece and in Mediaeval France there may very well have been no draughtsmen at all. The student got his construction at first hand, and was taught composition only in the stone studies of his predecessors. A school with this basis is really an idealized office. The student is, of course, always taught by practicing architects. He is not, however, obliged to get out sets of drawings for immediate execution but has time to acquire a knowledge of all that is best in the world, both of men and of their productions; and for the acquisition of

skill in composition. In and through all his study the student must think carefully and deeply because, in the attainment of that element which alone is lacking in our architecture, to make it greater than any that the world has seen, he must cross the gap which separates him from the workman and his tools and processes. He must keep constantly in mind that there is no method of drawing that will take him more than a pitiful part of the distance across that gap, that any trickery that distracts his attention from the task before him is a monstrous waste, and that he can succeed in foreseeing his results only by the sheer force of his trained imagination.

If the results of straightforward thought in architecture are at first less satisfactory from the viewpoint of sensual beauty than imitations of the past, shall we hesitate? Shall we not feel rather that that beauty which is the outcome of our own labors, the best to which our own aspirations can lift us, mean however it may be, poor and a little shame-faced in the light of what men have done, is for us best? Imagine an embargo placed upon architectural students. Imagine an agreement to shut all the books and closet all the phographs. We should then look about and see; of all our borrowed raiment some has fitted and some has not. We might then go on from fitness to greater fitness. Can not our ingenuity and force, so triumphant in some directions, triumph in others? Aghast, the archaeologist will denounce; the result of such a course can be nothing but ugliness. What? Have we no beauty in our souls? Can we appreciate only, and purloin, not create? Then, in all truth, we have no right to beauty.

William Luther Mowll.



HOUSE OF HAUPTMANN VON JENA.

Mühlradlitz. Rudolph Zahn, Architect.

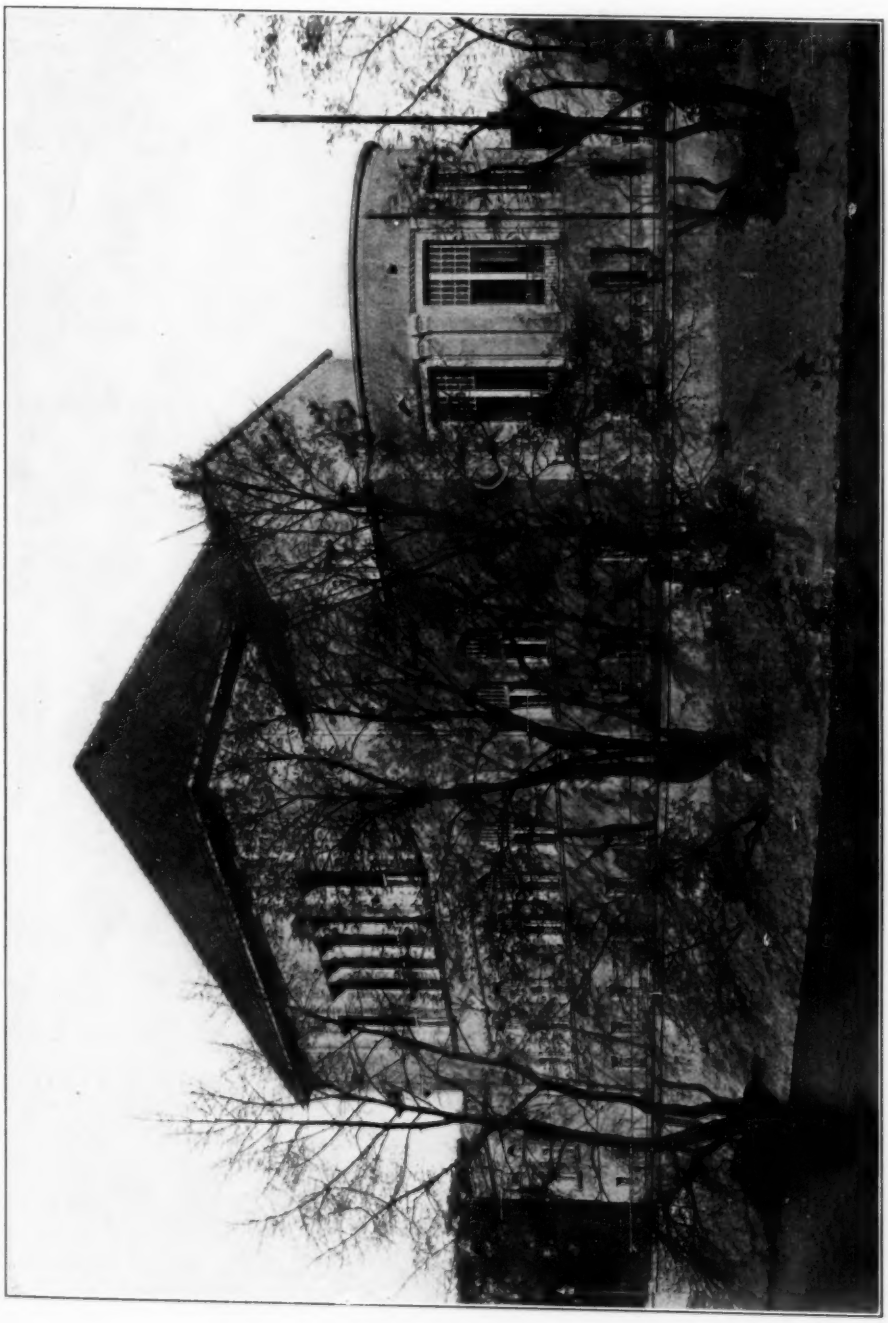
A Contemporary German Architect

About the last European country which the majority of American architects would visit for the purpose of learning something valuable from foreign practice would be Germany. All of them who can, travel in Italy, because Italy was the land in which Renaissance architecture originated and in which its most beautiful and instructive monuments remain. Many travel in England, because of the fascination which English domestic architecture inevitably has to offer to the descendants of Englishmen living in another Continent. Either directly or indirectly nine American architects out of every ten are profoundly influenced both by the forms and the methods which lie at the basis of modern French architectural practice. As we all know, this French influence is most powerful of all, partly because the Parisian School is the place to which the majority of American students go, and partly because the French national tradition in architecture and in the fine arts generally possesses indisputable authority. Almost alone among European nations the French have succeeded in establishing a really national body of architectural forms and methods—one that is founded on common sense, practical availability and some continuity of effort and achievement. It is no wonder, consequently, that contemporary French practice has influenced American architecture incomparably more than has the practice of any European country, and one result of this influence has undoubtedly been a tendency to treat almost with contempt the great mass of German art and architecture.

The writer once dropped into the studio of an American sculptor, who was working upon a monument of some importance for a Western city, and whose figure had just been criticised by an associate who stood somewhere near the head of his profession in this country. The scupltor was regarding his work, which was assuredly an example of bold and skillful modeling, with something like despair, because his critic had described the general effect of his work by the fatal epithet "Teutonic." Just what was meant by this damning description I shall not attempt to define; but the sculptor, who had incurred this awful reproach, and who was himself palpably of German parentage, did not hesitate to assume that if the sentence was true, it was final. An American work of art might be described by many dubious adjectives and have some chance of salvation; but to say that it was "Teutonic" was comparable to the attribution of levity to a book of religious meditation. It somehow contradicted its claim to be considered as a work of art.

This incident is undoubtedly typical of the attitude of the great majority of American artists towards German art; and while there undoubtedly result therefrom a great many exaggerated and merely prejudiced judgments, its origin and comparative justification are not difficult to understand. Americans have had little to learn from German art, either in its historical or technical aspects; and those German enthusiasts who are trying to fill American museums with historical examples of German art are wasting their time. Such relics may be interesting from a sentimental, picturesque or scientific point of view, but they are of no practical value to the modern American artist, and he does not go far wrong in dismissing them from consideration. This is particularly true of German architecture. There is little or nothing in the architectural history of Germany, the conscientious and sympathetic study of which would be of any use to the modern American architect. The German Renaissance is merely a corrupt and awkward imitation of French and Italian originals; and an architect who prefers the so-called freer forms can find more and better food for thought in England. Germany has had no authoritative and consistent architectural tradition, because, until recently,

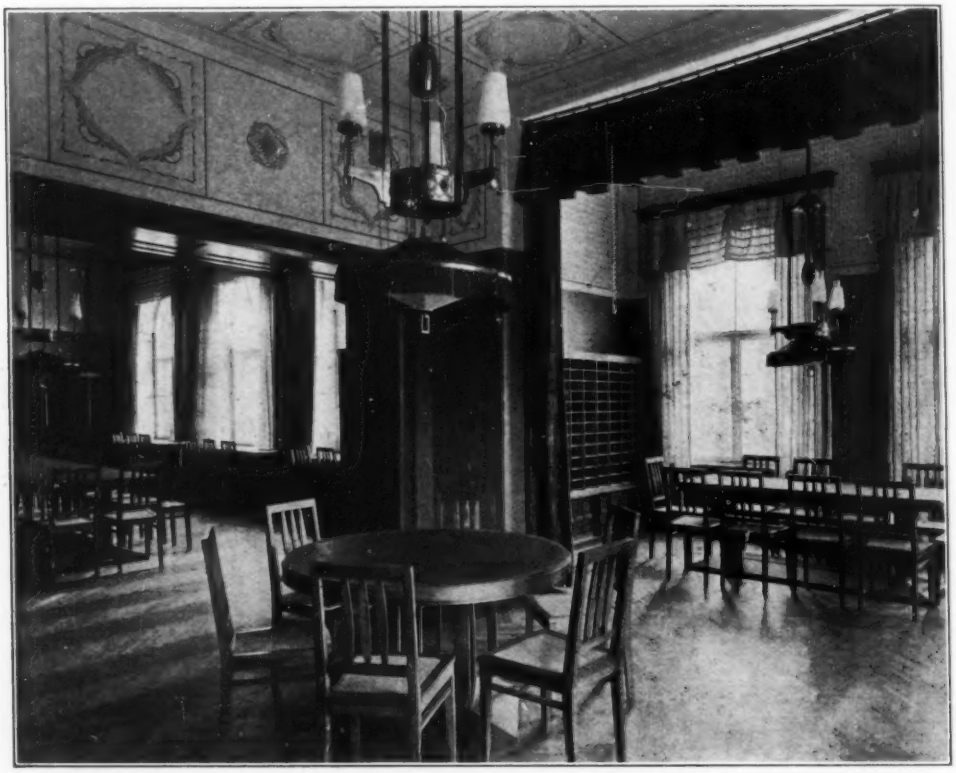
A CLUB IN BRESLAU. Rudolph Zahn, Architect.



A CLUB IN BRESLAU. Rudolph Zahn, Architect.

it has had no effective national organization or no consistent and formative national tradition. Its plastic artistic history has been one of individual and temporary exceptions to a general level of mediocre and distracted effect. There have, of course, been great individuals and fine moments in German art, as there have been in the art of most other European peoples; but the great individuals have been painters and handicraftsmen, rather than architects or sculptors, and even in painting the great individuals have occupied a more than usually lonely position. In architecture the Germans have, on the whole, been imitative, without being successful in their imitations, and they have had, until recently, no opportunity of erecting on the foundation of their borrowed forms a really national architectural tradition.

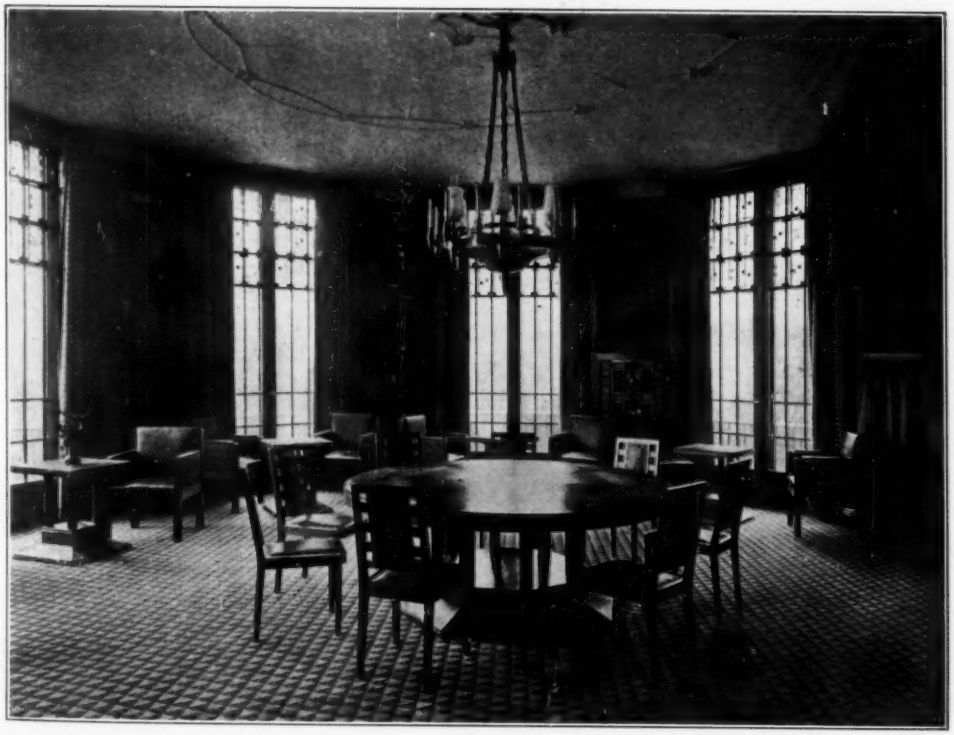
It is no wonder, consequently, that artists should tend to overlook and disparage the art of a people who had for some hundreds of years been doing with indifferent success a class of work which they themselves were trying to do better. Nevertheless, it is time for them to understand that conditions have changed during the past generation, and that the time is coming when they may have more to learn from Germany than they have had in the past. For about forty years the German people has possessed a national organization, based upon her political traditions and suitable to her living needs; and during these years the Germans have been accomplishing certain results, which are better worth serious attention on the part of Americans than are the similar achievements of any other European people.



A CLUB IN BRESLAU.

Rudolph Zahn, Architect.

BANQUET HALL.



A CLUB IN BRESLAU.

Rudolph Zahn, Architect.

The truth of this statement, in its application to certain political and economic problems, is indisputable. The fact that our own country is an English-speaking

A CLUB IN BRESLAU.
(Detail of Banquet Hall.) Rudolph Zahn, Architect.

democracy has tended to blind Americans to the fact that German political needs and methods are in certain respects more similar to our own than are those of France and England. In France and England the general government possesses supreme and undivided authority. In Germany and the United States a Federal constitutional system prevails, which leaves the local governments in possession of certain essential attributes of sovereignty. In France

and England the Executive is responsible to the Legislature, and the Legislature is practically omnipotent. Germany and the United States, on the other hand, possess independent Executives, whose powers and functions, different as they are, give a certain similarity to the machinery whereby important political and economic reforms are accomplished. Precisely because Germany possesses an independent and powerful Executive, with the authority to initiate important legislative and administrational measures, Germany has during the past forty years accomplished more in the way of constructive. economic and social legislation than has any other European country. It has made far greater strides towards the organization of an efficient national industrial system than has the United States; and in these matters the American people have an enormous deal to learn from Germany, as they will be made to understand during the next twenty-five years.

In the arts we have less to learn from Germany than we have in practical affairs; but what we have to learn is of great importance. The interest of contemporary German architecture for the contemporary American architect consists partly in the circumstance that the problem confronting the architects of the two countries is somewhat similar. Germany, like the United States, is a young nation, without any specific or consistent national architectural tradition. For several centuries German architecture has been imitative, and the large amount of learning which has characterized this imitation has not prevented it from being indiscriminate, distracting and wholly unauthoritative. There is no more reason why this habit of imitation should bind contemporary German architects than that the American architect should be bound by the Classic or Gothic revivals. What, then, is the German architect to do at the present time in order to begin the great work of establishing a group of authoritative national architectural forms? Most assuredly he cannot nationalize German architecture by continuing in the old path of learned but indiscriminate and somewhat awkward imitation. Neither can he give his work any authority, in case he breaks entirely away from the past and attempts to establish a wholly new and unconventional group of architectural forms. Obviously his answer to these perplexing questions, which involves the attempt to reconcile apparently irreconcilable demands, must lie along lines similar to those which determine the behavior of an American architect in a similar situation. He must manage gradually to adjust the architectural forms, familiar to the German people, to contemporary practical needs; and he must reach his architectural effects chiefly by a thorough simplification of those forms, guided in its achievement by a more refined and disciplined sense of beauty.

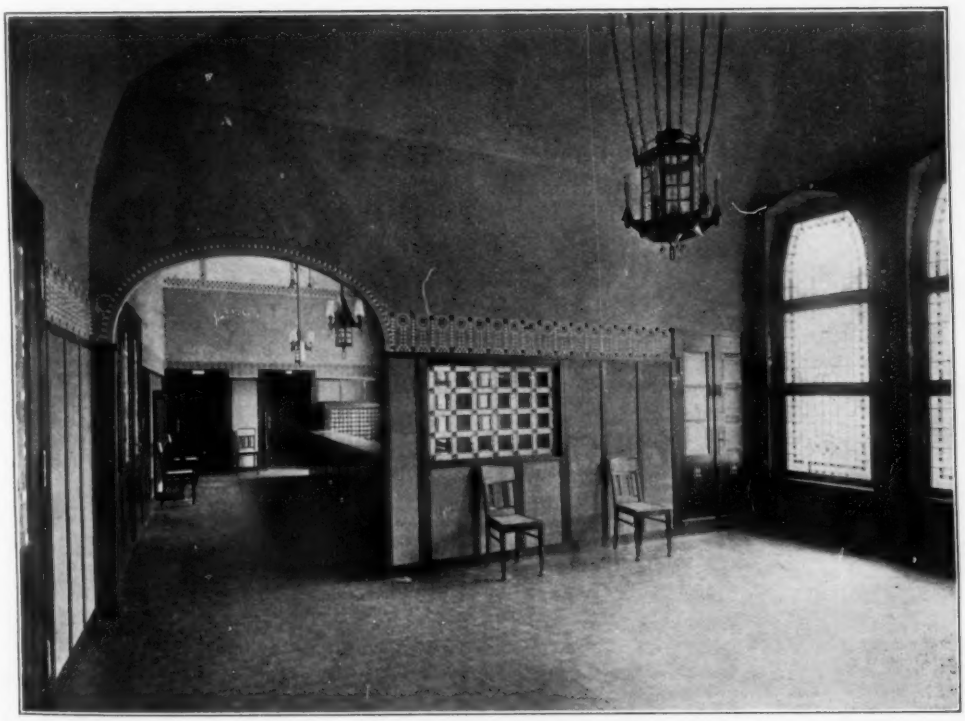
The problem confronting the architects of the two countries is consequently similiar, but in working out the answer to the problem the German architect is at liberty to go ahead more rapidly than is the American architect. The situation in Germany differs from the situation in this country chiefly in one important respect. The Germans are young as a nation but they are old as a people. Their architecture has lacked in vitality since the early middle ages. Particularly during the past three hundred years they have been imitating Renaissance forms with more or less learning but with little of the necessary feeling for the peculiar value of the style. France has added something essential and real to the development of the Renaissance forms. Germany has added nothing. The very fact of this comparative failure makes it desirable and even imperative that German architects should be both original and daring in seeking the proper direction for a more natural architectural development. They may not break away entirely from the past, because that would mean revolutionary chaos, but just because German architecture has exhausted the possible value of imitative methods they must be drastic in their simplification of the older forms and (so far as possible) uncompromising in their applications of national ideals to specific architectural problems; and finally they may adopt a line of this kind with some chance of success, because in almost

SKATING CLUB OF BONN.

Bonn on the Rhine.

Rudolph Zahn, Architect.

DINING ROOM.



SKATING CLUB OF BONN.

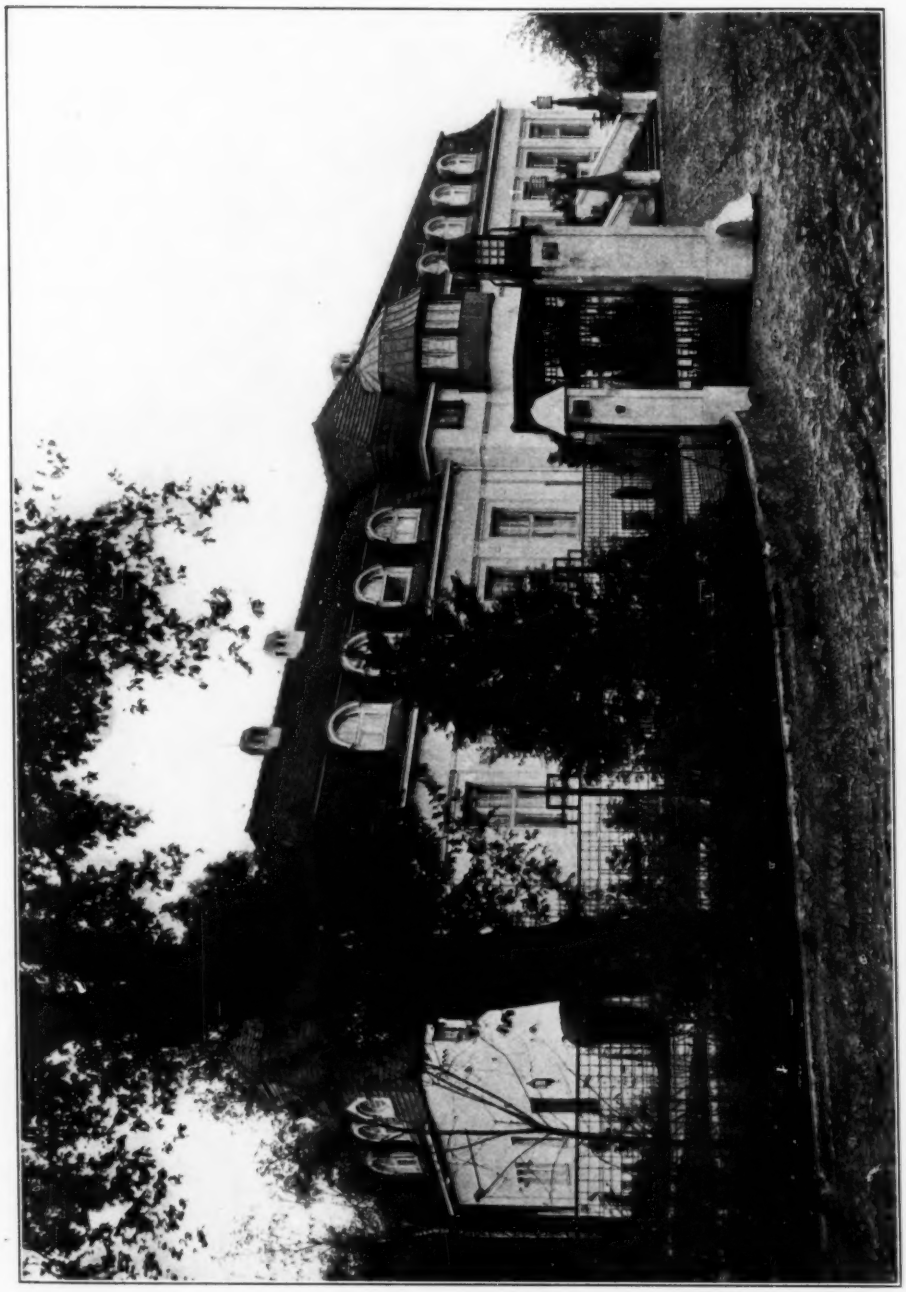
Bonn on the Rhine. Rudolph Zahn, Architect.

every department of contemporary work the Germans have shown themselves capable of constructive intellectual initiative and of expert leadership directed toward the accomplishment of a desirable collective purpose.

American architecture, on the other hand, has not by any means exhausted the benefit which it may derive from sympathetic imitation. Just at present there is less need of architectural originality in this country, partly because the popular architectural taste needs to be familiarized with a sound tradition of style, and partly because American architectural imitation is by way of reaching permanently valuable results. Our best architects are designing really beautiful buildings along strictly traditional lines; and inasmuch as American thought in practically every department of practical and technical work is lacking in justifiable originality and self-confidence, the safer path is for the present the better path. There seems to be a good prospect that the American architect will justify his caution and his conservatism by adding a new refinement to the development of the Renaissance architectural tradition; and architectural criticism should strengthen the bands of the conservative practitioner, just in so far as conservatism results in increased propriety and distinction of style. But there can be no doubt that in the course of time the American architect, also, will exhaust the benefits of a merely conservative architectural practice and that American architectural progress will require a more drastic simplification of the traditional forms and a more rational treatment of specific architectural problems. The confident anticipation that such a condition will eventually arise in this country lends a very practical interest from the point of view of the American architect to the experiments of the more progressive contemporary German architects. If these experiments are successful, they will command the attention of the American architect, who is seeking emancipation along similar lines, and even when their success is very questionable, they should not receive the same condemnation that might be visited on an American architect, who took similarly unsuccessful liberties with traditional forms.

It is with the foregoing general considerations in mind that an American critic should approach the consideration of the class of German work, illustrated herewith. This particular German architect, Mr. Rudolph Zahn, belongs distinctly to the more progressive school. He has broken away from the traditional forms more completely than have the better of his contemporaries and more completely than was really necessary. But he has broken away more in his details than he has in use of masses and his methods of composition; and the general effect of his buildings, while startling, is by no means shocking and disconcerting. His buildings awaken remotely certain familiar and pleasant associations —associations which to the writer are connected with the picturesque late mediaeval architecture of certain German cities; and in all probability these are the worthiest reminiscences of earlier German buildings, which a contemporary German architect can seek to arouse. The association is remote, because every one of Mr. Zahn's buildings illustrated herewith is detached, and because the architect has permitted himself only a discreet use of merely picturesque effects. Yet picturesque these buildings are with a picturesqueness obtained chiefly by the treatment of gabled roofs, and this picturesqueness is traditional rather than modern in the effect it produces. But picturesque as they tend to be, these buildings are none the less well composed in their masses and restful in their appearance. They do not exhibit the slightest strain after merely striking novel and bizarre effects. In spite of their obvious and intentional originality they have not departed from a fundamentally sound stylistic tradition.

On the other hand, the system of ornamentation adopted by Mr. Zahn is not by any means so sound or so successful. The more progressive architects of all countries have in the opinion of the writer failed far more completely in their attempts to substitute new decorative forms than they have in their attempts to give a novel aspect to the general effect of their



HOUSE OF HAUPTMANN VON JENA. Rudolph Zahn, Architect.

Mühlradlitz.

buildings. No substitute has as yet been worked out for the classic methods of ornamentation that has anything like the propriety and beauty of the traditional forms; and the consequence is that architectural innovators usually commit either one of two mistakes. They either pile on crude and fantastic ornaments, which tend to discredit the whole progressive movement, or else they avoid ornamentation to an extent which makes their buildings excessively severe and ascetic in appearance. Mr. Zahn is too intelligent a designer to fall headlong into either of these extremes. His ornament has been sparingly applied, but his discretion has not tempted him to make his buildings a desert in their lack of decorative detail. The ornament which he has used has been applied in about the right quantities and in about the right places. He has even on occasions in the detail he has used permitted himself the liberty of remotely suggesting some of the traditional forms. Nevertheless his ornament has to the eye of the writer added little or nothing to the distinction of his buildings. Doubtless its absence would be missed; but its presence is either annoying or at best merely to be tolerated; and this criticism increases in force whenever the forms become accessory to a strictly architectural effect. The ornamental iron-work on the house of Hauptmann von Jena is ingenious, but is entirely lacking in distinction, and the same comment applies to the detail of the interiors. The system of interior decoration has been manifestly designed by an architect, who knew where and what sort of ornament was needed; but the impression it makes on the writer is distinctly disagreeable.

A. C. David.

HAUPTMANN VON JENA'S HOUSE—ENTRANCE.

Rudolph Zahn, Architect.

RECENT EUROPEAN ARCHITECTURE

A. MARSHALL MACKENZIE & SON

"Hursley Park," Estate of Sir George Cooper, Bart.
Hampshire, England

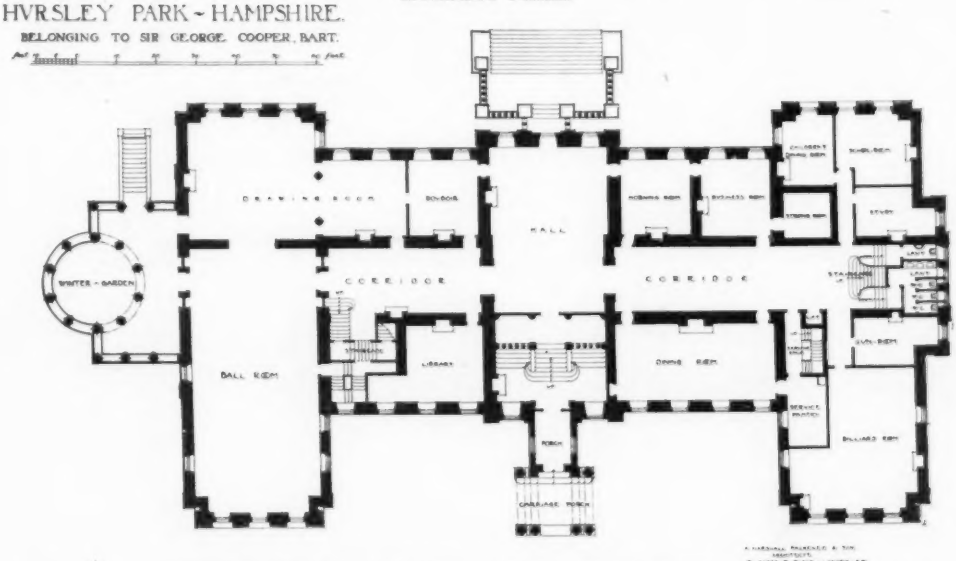
LOSSOW & KÜHNE

Villa in Dresden
Castle near Dresden (from architects' model)
Villa Moras
Cottage near Dresden

ALBERT GESSNER

Sanatorium of Dr. Warda, Blankenburg, Thuringia

"HURSLEY PARK."



"HURSLEY PARK," ESTATE OF SIR GEORGE COOPER, BART.

Hampshire, England. A. Marshall Mackenzie & Son, Architects.

"HURSLEY PARK"—CORNER OF DRAWING ROOM.
A. Marshall Mackenzie & Son, Architects.

"HURSLEY PARK," BOUDOIR.
A. Marshall Mackenzie & Son, Architects.

"HURSLEY PARK," THE HALL.
A. Marshall Mackenzie & Son, Architects.

VILLA IN DRESDEN, 1908.

Lossow & Kühne, Architects.

VILLA IN DRESDEN, 1908.

Lossow & Kühne, Architects.

A CASTLE NEAR DRESDEN.

A CASTLE NEAR DRESDEN.
(From the architects' model.) Lossow & Kühne, Architects.

A CASTLE NEAR DRESDEN.

Lossow & Kühne, Architects.

A CASTLE NEAR DRESDEN.

Lossow & Kühne, Architects.

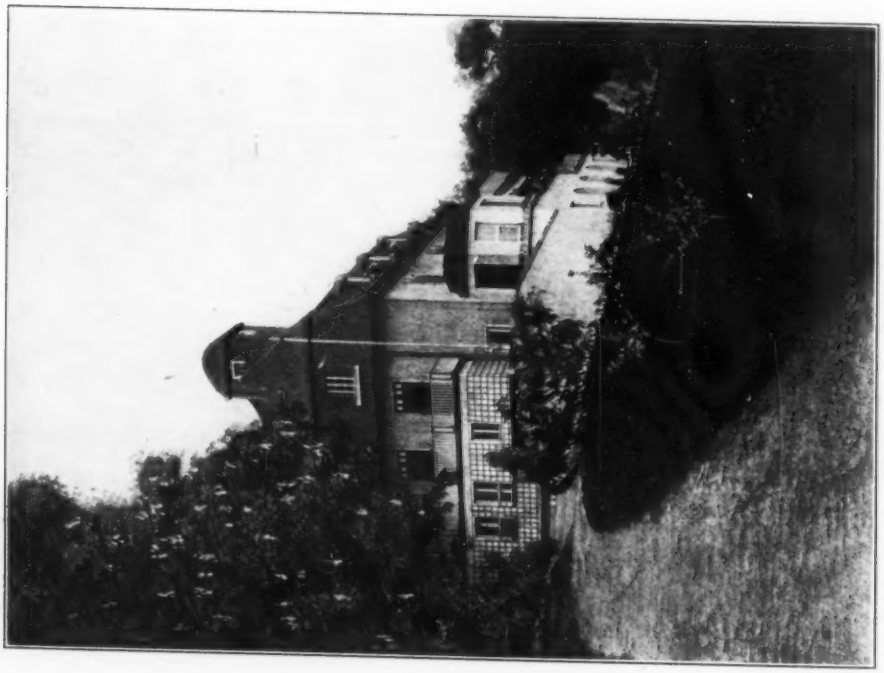
(From the architects' model.)

SANATORIUM OF DR. WARDA.

SANATORIUM OF DR. WARDA.

Blankenburg, Thuringia. Albert Gessner, Architect.

COTTAGE NEAR DRESDEN.
Lossow & Kühne, Architects.



VILLA MORAS, 1907.
Lossow & Kühne, Architects.

The Evolution of Architectural Ornament

II.

Ornament with a Foliage Basis—The Acanthus

So far as the Classic school of foliage ornament is concerned, the only type which is purely conventional is that which has already been dealt with—the anthemion and its variations—with the exception of a few minor enrichments which must be reserved for later treatment. There is, however, a large amount of naturalesque foliage, based, in Grecian times entirely and in Roman and Byzantine times very largely, upon the acanthus leaf. This, in its natural form, is represented in Fig. 31. It is a large leaf on a stem somewhat resembling that of the rhubarb, but, as will be noticed, it is divided into a series of lobes by deep identations, and each lobe is itself serrated along the edge with sharp saw-tooth serrations of a curiously curved outline. It is eminently a leaf which is open to conventionalization.

At what time it first came to be used for the purposes of architectural ornament is entirely unknown. It appears in its perfect form on the earliest example which remains, with nothing to lead up to it whatever, this example being the internal (Corinthian) order of the Tholos at Epidauros. It is next found in the frieze on the cella of the Erechtheion, which has already been illustrated in Fig. 13,* though it occurs there only as the small covering leaf to the junctions between the scroll and the flowers. The Corinthian capital, however, is very little else than a bunch of acanthus leaves, attached as ornament to a bell or basket, having tendrils for volutes; but often, in combination with the acanthus, there is a row of plain pointed leaves, such as those of ordinary grass. Such are to be found on the capitals of the Choragic Monument of Lysicrates at Athens, illustrated in Fig. 32, from a cast in the British Museum, and unfortunately in a very dilapidated condition.

*March number, 1910.

As when this photograph was taken the capital of the Tower of the Winds possessed by the British Museum was exhibited close by, a photograph of that also appears on the same illustration. It is a much later example, for the Choragic Monument was built in 335 B. C., and the Tower of the Winds not until about 150 B. C., and it is devoid of volutes, but it shows both the plain leaf and the acanthus leaf, the plain leaf in this case being above the acanthus.

A much more distinct illustration of this is given in Fig. 33, in which some of the principal Grecian characteristics can be recognized. The outline is sharply cut, and there is no great amount of surface curvature, while the lobes have the central vein of each well-defined and carried right down to the base, whch is widened out and not contracted on to a stalk; the point of the whole leaf is made to curl over. The plain leaves are in strong contrast to the acanthus, but they, too, are significant of the Greek feeling in their simple and decisive lines, well defined and cleanly cut.

While the name of acanthus is given to all the rich leaf foliage of this type, yet there are some writers who speak of the parsley also, and there are certainly examples, particularly in Grecian work, which indicate rather the following of the parsley with its clusters, than the acanthus with its large serrated leaves. An example of this, well known to all visitors to the British Museum, is the small fragment from the Temple of Diana at Ephesus, illustrated in Fig. 34, representing the enrichment of the cymatium moulding which surmounted the cornice. This photograph is given to indicate its general effect. There is a large tendril scroll continued along the cymatium and standing out from its surface, which is that of an exceedingly refined cyma recta. It is purely applied ornament in considerable relief, throw-

Fig. 31. Natural Acanthus Leaf.

ing a strong shadow in the top-lighted Museum, just as it would do under the bright sun of Greece. The photograph also indicates how a gutter is cut out of stone at the back of the cymatium. The parsley character of the ornament is perhaps better seen in the detail pencil sketch, Fig. 35. It is so sharply cut that it looks more like wax modeling than marble carving; it is just the sort of thing that could be done with the fingers in a plastic material, and it is possible that the designer worked in that way rather than by making a sketch on a flat surface. The date of this example is about 350 B. C.

The British Museum contains another example of the same type of work, also believed to have come from Ephesus. It is in the form of a somewhat flatly cut pilaster cap, the date of which is unknown; it is illustrated in Fig. 36. In this case the leaves do not so clearly stand out from the background as in the examples hitherto mentioned, but neither is the workmanship of Byzantine character. It is still real carving, and the leaf, which occurs beneath a tendril volute, shows both the well-separated and indented lobes of the acanthus and the crisply curled-over clusters of the parsley, these latter appearing as if they spring from the base of the deeper in-

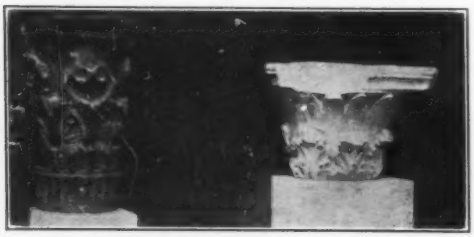


Fig. 32. Capitals from the Choragic Monument of Lysicrates (Cast) and the Tower of the Winds (Original) at Athens.
(British Museum.)

Fig. 33. Capital from the Tower of the Winds, Athens.
(British Museum.)

dentations. It thus almost appears as if this clustering variation of the acanthus foliage belonged to Syria rather than to Greece, and one would, consequently, expect to find that the true acanthus was confined more to Greece. This, however, is not borne out, for there is one Corinthian capital in the British Museum, the largest of the Grecian period which is known to exist, which has been brought from the site of the Temple of Diana at Ephesus, and shows the true acanthus

Fig. 34. Portion of the Cymatium (Cyma recta) Surmounting the Cornice of the Temple of Diana at Ephesus.
(British Museum.)

leaves in all their simplicity. This is illustrated in Fig. 37. It is elliptical in plan and considerably better carved on the face, shown on the illustration than it is upon the back, while there are clear indications of its having suffered both from fire and water. Nothing more is known of it; nobody has been able to give it a place in the Temple of Diana; nobody has been able to ascribe a date to it; but it does not appear to belong to the best period, for the carving is comparatively crude and shows indications of degraded later work, as, for instance, where the points of the two leaves are allowed to join in order to secure strength, and in the over-emphasizing of the hollows. If trouble be taken to compare the forms of the serrations with those upon the natural leaf illustrated in Fig. 31, it will be seen that the resemblance is considerable. It is just possible that this capital was never completed. The leaves of the lowest tier, for instance, have a bare space between them which ought to be filled with the detail of the tier behind, but is not.

Fig. 35. Acanthus Scroll from Cornice Cymatium of the Temple of Diana at Ephesus.
(British Museum.)

Fig. 36. Acanthus Leaf on Pilaster Cap from Ephesus.
(British Museum.)

The supposition that this is of a late date is borne out by the great similarity between these leaves and those of certain fragments, such as that illustrated in Fig. 38, which are distinctly of the Byzantine type, having an almost flat surface and a background of unequal depth, instead of an even background and applied carving of varying depth. It is a pity that in this case, again, the date is uncertain. All that can be said is that the type of the acanthus leaf had become well established by the time

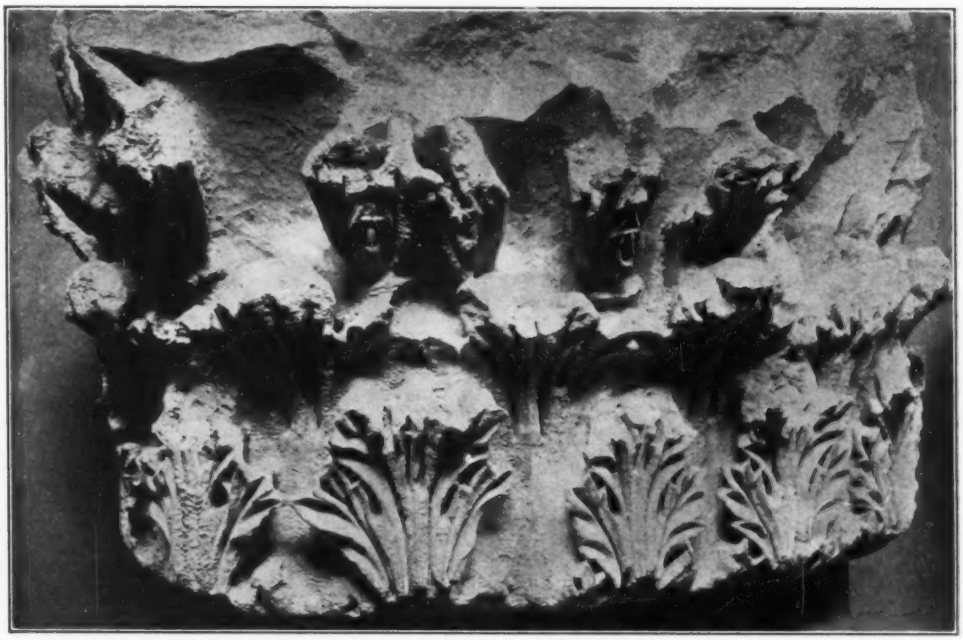


FIG. 37. CORINTHIAN CAPITAL BROUGHT FROM THE SITE OF THE TEMPLE OF DIANA AT EPHESUS—NOW IN THE BRITISH MUSEUM.

that this was carved, and was now capable of adaptation to any style which might arise.

The Romans used the acanthus much, changing its character, as they did all the other Grecian forms of ornamentation, and varying its outline to a considerable extent. As a rule, they were not such good workmen as the Greeks, or, at any rate, they aimed at producing a greater amount of effect with less precision of outline. It is also more possible to recognize in Roman work that each craftsman had a technique of his own. All that can be done, therefore, is to give a few typical examples to show what alterations were made, and to indicate that these were capable of infinite expansion—and received it to a large extent, though generally in the same spirit. Fig. 39 will indicate fairly well what this was. Two types of leaves are shown which occur round the base of a Roman column. Plain leaves and true acanthus leaves are alternately introduced, but even the plain leaves have the edges crinkled and a surface wave imparted to them. This could have been done only at the expenditure of a considerable amount of labor, and it is perhaps doubtful whether the result has justified it, but the effect is that of a growing leaf and not of a conventionalized ornament. It is the same with the acanthus, the outline of which, while still serrated, is

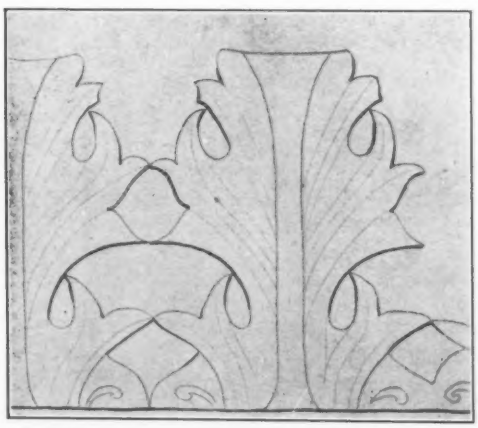


Fig. 38. Fragment of a Pilaster Capital Probably from Athens.
(British Museum.)

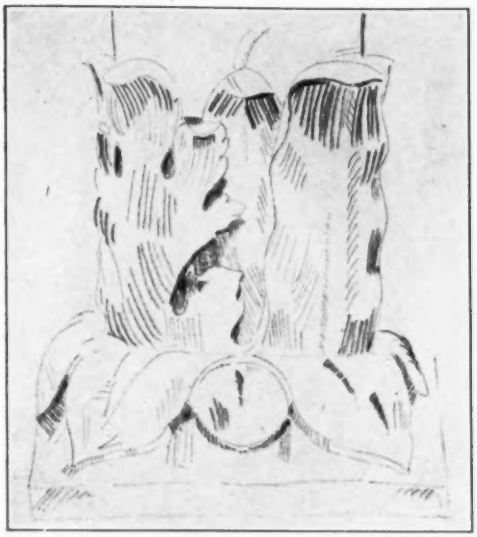


Fig. 39. Base of a Roman Column. (Victoria and Albert Museum.)

treated in a purely natural way and not in regularly arranged curves. The bottom lobe is particularly noticeable, and may well be compared with the lobes on Fig. 31. In the illustration, an attempt has been made to indicate the surface curves, but it will be noticed that there are no veins. The same thing is illustrated even more clearly in Fig. 40, which shows one of the acanthus leaves

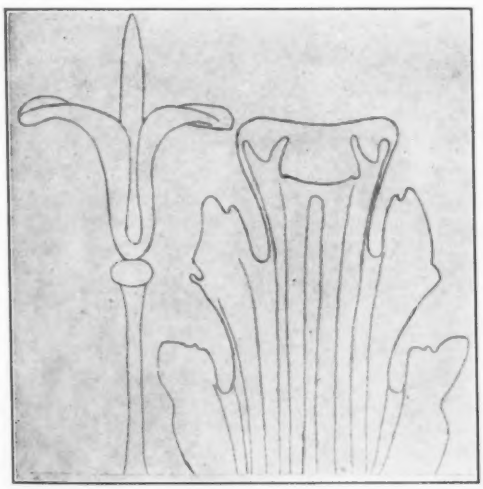


Fig. 40. Fragment of Acanthus from a Pilaster Capital.

of the pilaster capital from the internal Order of the Pantheon at Rome. The outlines are far from being conventionalized or decorative, but the result, even when viewed from a comparatively short distance, is successful. The leaves have a natural appearance, and yet are not too entirely natural, for the detail is not fully worked out, and they are scarcely suited to the polished white marble—the material in which they are executed. It will be noticed that there is a great difference between this system of carving foliage and that of the Greeks, which was always more or less conventionalized and sharp in outline.

The use of the acanthus was not now confined to a few positions only; it is found in Roman work wherever a leaf ornamentation was desired. Fig. 41 shows it as applied to a candelabrum, of which there is a cast in the Victoria and Albert Museum. Some of the upper leaves are designed with the crinkled edge even more prominently displayed than in Fig. 39, but the acanthus is less natural; the leaves are extended considerably, even to an extent which might render them fragile at the points, and the edges are both serrated and crinkled. A little further examination of this candelabrum will show that other foliage is introduced in a perfectly natural manner, but only to a minor extent.

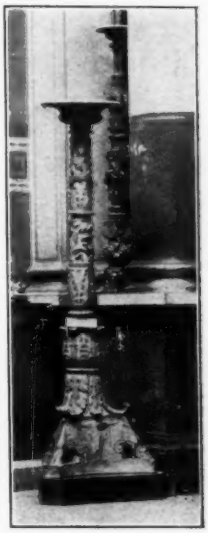


Fig. 41. Roman Candelabrum. (Victoria and Albert Museum.)

Much the same spirit permeates the acanthus foliage, which is used to a lavish extent on the Roman capital, now in the Louvre at Paris, illustrated in Fig. 42. The Ionic volute is crowded with it, and so is the drum of the return, while another long acanthus leaf is used to fill up the somewhat awkward gap above the row of egg and dart enrichments on

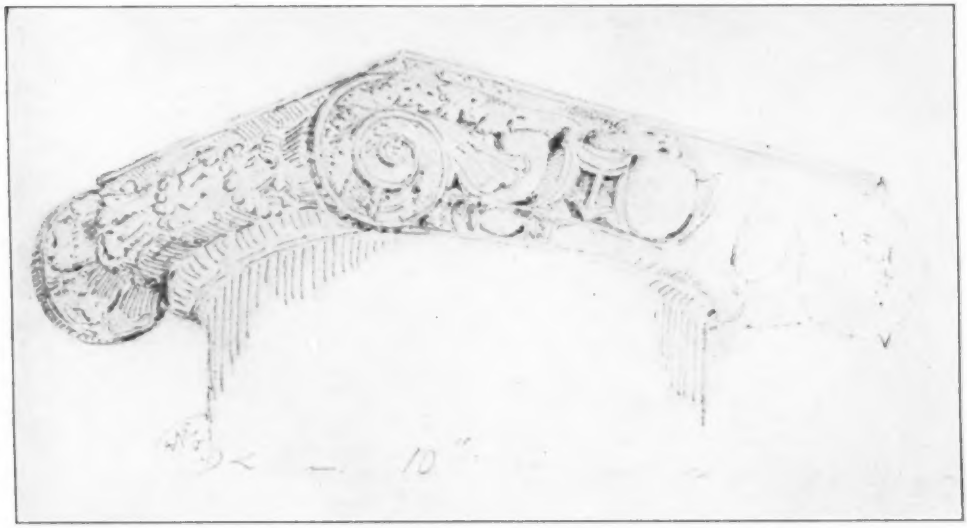


FIG. 42. ROMAN CAPITAL FROM THE LOUVRE, PARIS.

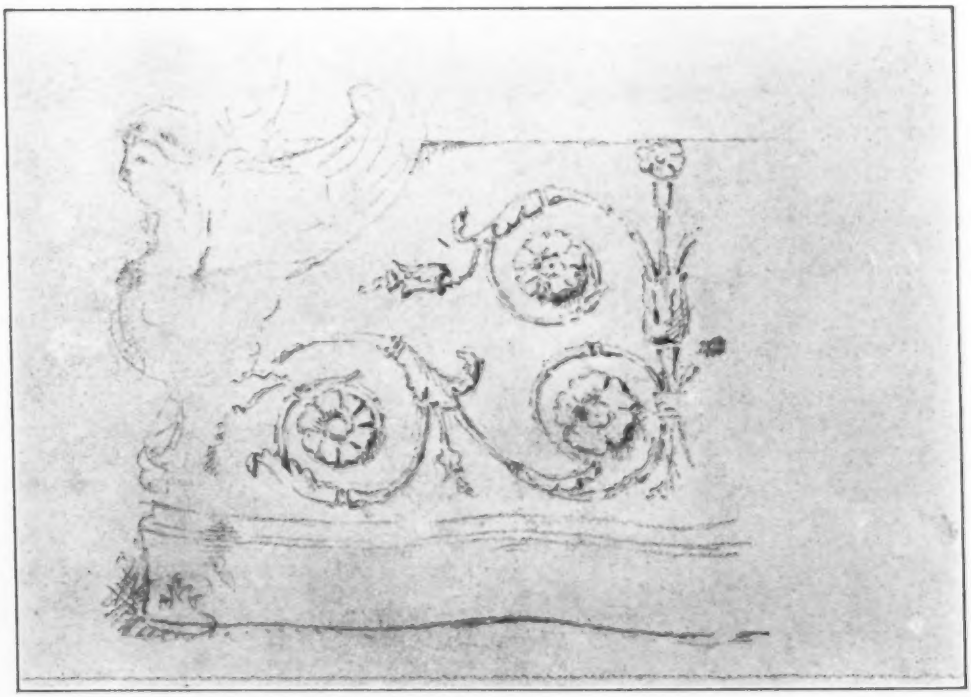


FIG. 43. SCROLL ON BASE OF A ROMAN CANDELABRUM.
(British Museum.)

Fig. 44. Jamb of East Door, Mainz Cathedral.

the circularly planned echinus. The extreme shallowness of the capital may also be observed, but it can hardly be considered a typical example, but rather as an exceptional one of the later elaborated period. Work such as this has been more frequently copied of recent years in softer materials than marble, in which a large amount of decoration is more justifiable. The acanthus has here been over-employed, to the destruction of simplicity of outline.

That the acanthus is capable of quite free treatment and of uses in many ways is indicated by Fig. 43, which shows a lightly designed scroll which appears at the base of a candelabrum of Roman date, now in the British Museum. In fact, the essence of the design is a scroll formed by a twisting tendril or stalk, which terminates in flowers and buds, the acanthus leaf being used only to conventionally suggest some ornamental leaf growing out of a stalk, where needed for decorative purposes and for covering the junctions of the tendrils. Any other leaf could have been similarly employed, but if the flowers had represented those of some definitely recognizable plant the leaves also should have been those of the same plant—of course, in a conventional form.

It will thus be seen that the Romans fully understood that the acanthus was a conventional leaf which could be employed in many different ways and places. They used it in wreaths in high relief, as well as for the enrichment of capitals and in low relief in scrolls; in

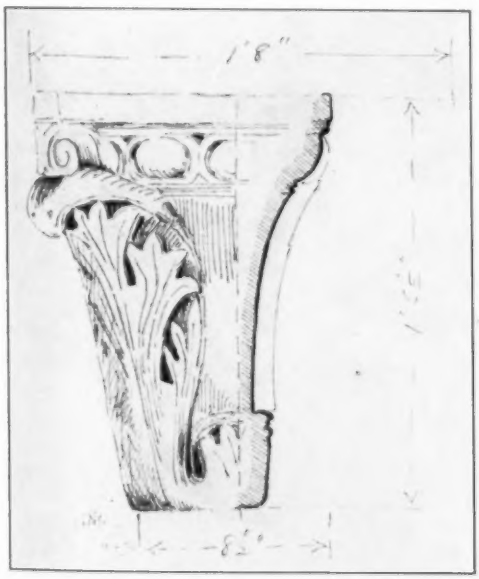


Fig. 45. Half of Romanesque Cap (XI Century), now in the Courtyard of Hotel Croix d'Or, Toissons.

Fig. 46. Capital in the Baptistery, St. Jean, Poitiers.

Fig. 47. Apse of the Baptistery, St. Jean, Poitiers.

Fig. 48. Wall Arcade, North Transept, Laon Cathedral.

fact, they seem to have fallen back upon it as their standard method of ornamentation wherever a rich carved effect was desired. Wherever the Romans went they took with them the traditional employment of the acanthus, and although there are few, if any, remains of its use upon Roman buildings throughout the great districts of the Rhine, of France and of England, where the Roman power was predominant, yet the acanthus appears again and again upon the subsequent Romanesque work of those vast districts, which was obviously based upon remains such as the Romans must have left behind. Strangely enough, its use is again almost entirely confined to capitals, as it had been in the time of the Greeks, and these capitals partake of

Fig. 49. Italian Capital, Circa 1500 A. D. (Victoria and Albert Museum.)

a Corinthian character. This is very clearly indicated, for example, in the east door of Mainz Cathedral on the Rhine, shown in Fig. 44, the capitals of which might almost be of Roman execution, with their well-projecting leaves of pronounced acanthus in two tiers, and even with the little primrose-like flower introduced in one case similarly to those which are shown on Fig. 43. The cutting of the edges, however, is not of the purely natural character to which we have previously referred, but is almost always of a somewhat spiky type, such as is indicated in Fig. 45, which, although it has not come from the Rhine, but from Soissons, in the north of France, is

Fig. 50. Capital from an Italian Chimney-Piece.
(Victoria and Albert Museum.)

equally indebted to the Roman occupation of the district for its origin. A close examination of this illustration will show that it contains really two types of edge treatment, the two upper lobes being somewhat of the sharp character which is generally considered representative of the Grecian or Byzantine school, while the lower lobe has the rounded serrations of the Roman: more like the form shown in Fig. 46, which belongs to a district, that of Poitou, several hundred miles distant from the Rhine, but equally under Roman influence. The leaf in this case can only by

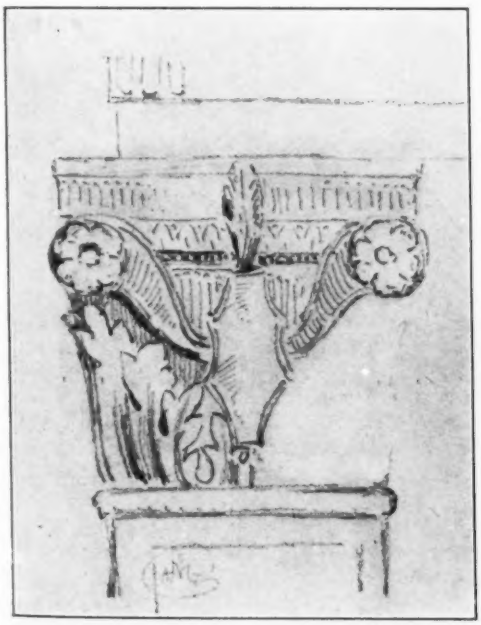


Fig. 51. Cap from Door of a Private Chapel of Church in Genoa, Erected by Lazaro Doria, A. D. 1472.

Fig. 53. Architrave Enrichment to Main Door, Church of Sta. Maria dei Miracoli, Venice.

courtesy be called an acanthus leaf at all, as it is one broad leaf, with deep serrations, and not a leaf of several lobes. The Corinthian volutes are replaced by four-petaled flowers, which rest upon the tips of the leaves. This original and very beautiful little capital was probably

executed about 550 A. D., and belongs to the small and comparativly little-known Baptistery of St. Jean at Poitiers, a general view of the apse of which is given in Fig. 47. The actual capital illustrated in Fig. 46 is one of the small ones of the wall arcade of the apse; the larger ones, which carry the impost of the apse archway, are of the more ordinary Corinthian type. This building at Poitiers is several hundred years older than those at Soissons and Mainz, already referred to, so that the Poitiers capital cannot be considered to be a development, but rather an eccentricity—a mere exceptional variant of a persistent type, of which another illustration is given in Fig. 48, from the wall arcade of the north transept of Laon Cathedral in north France, not far from Soissons, where it appears in conjunction with the pointed arch and belongs to the latter

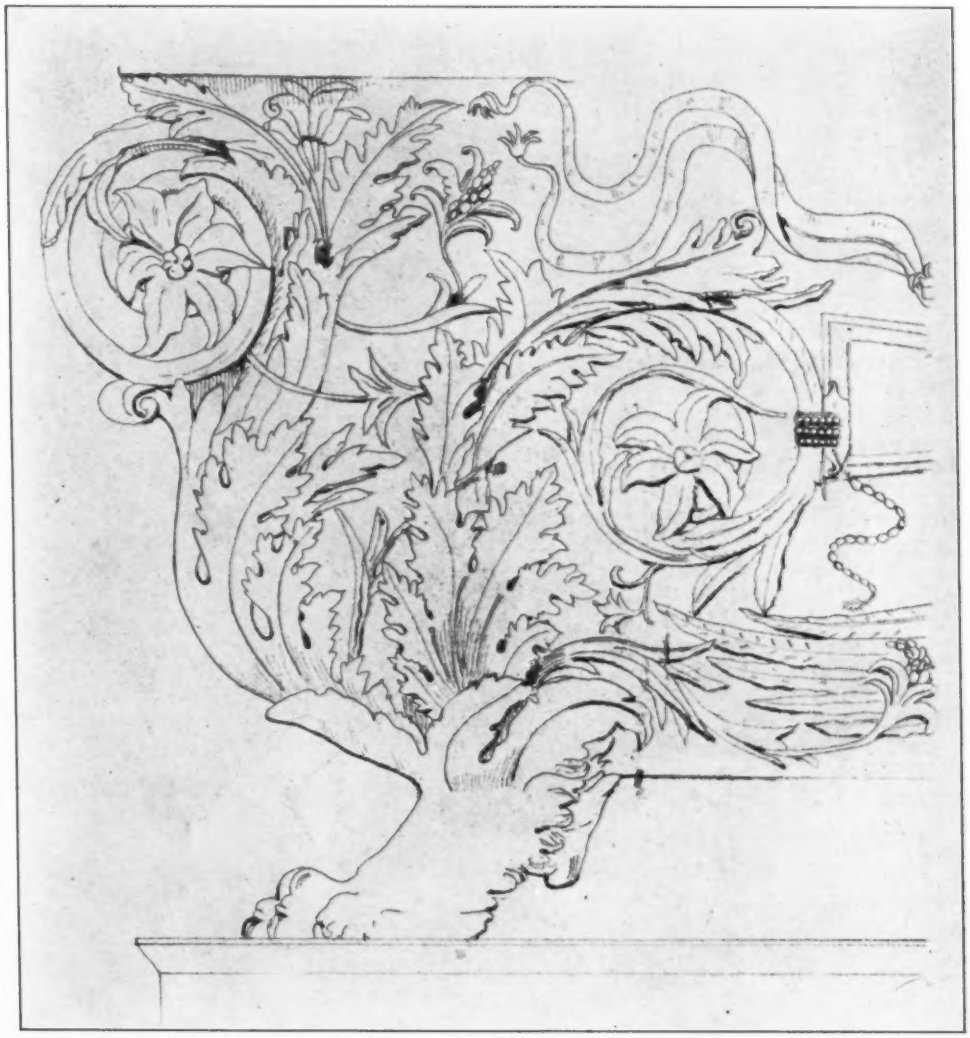


FIG. 52. PORTION OF MONUMENT TO CARDINAL MARSUPPINI, IN THE CHURCH OF STA. CROCE, FLORENCE.

part of the twelfth or the early part of the thirteenth century. The acanthus leaves are here of the ordinary Roman character, but the great interest of the illustration lies in the fact that two adjacent capitals are shown, one of them being acanthus carved, while the other consists of similarly arranged broad leaves curling over at the points; in other words, the well-known crochet cap of the early Gothic period in northern France. Glancing from one to the other, it is quite obvious that they are of the same origin; the broad crochet leaves which appear to be those of the hart's-tongue fern are little else than acanthus leaves without serrations, while the closely knotted "crochet" or hook at the point is only a tightened form of the usual termination of the acanthus leaf in Roman Corinthian work.

Except in a few French examples of an early date, obviously in pure succession to the work of the Romanesque period, there is no attempt at representing the acanthus while the Gothic styles dominated European architecture, but, with the advent of the Renaissance, it was introduced again. It is to be found in Italy, France, Germany and England, always Roman in its character until quite recent times and during the short period when, in England in particular, the inspiration of the modern work was taken direct from Greece. Thus the Italian capital, illustrated in Fig. 49, is highly suggestive of the purely naturalesque treatment of the capital from the Pantheon, illustrated in Fig. 40. Though the outline is slightly conventionalized, it is clearly nothing less than a replica of the Roman work of which there still remains a great deal in Italy; yet this was not the true spirit of the Renaissance which, above everything, introduced originality of treatment while adopting the old forms. So we find it in Fig. 50, which is quite typical of the larger work of the period, a capital from an Italian chimney-piece, now in the Victoria and Albert Museum. A dolphin's head has here replaced the volute, but the acanthus leaves of the normal Corinthian capital are still in evidence and of purely Roman outline. It will be noticed particularly that the lobes are very distinct, and that the veining is arranged with regard to the separate lobes rather than the whole leaf. This is sometimes found

Fig. 55. Choir Stall in St. Omer Cathedral.

in Roman work, but is a much more frequent characteristic of the Italian Renaissance. The relief is high, the carving being true carving, as in the Ro-

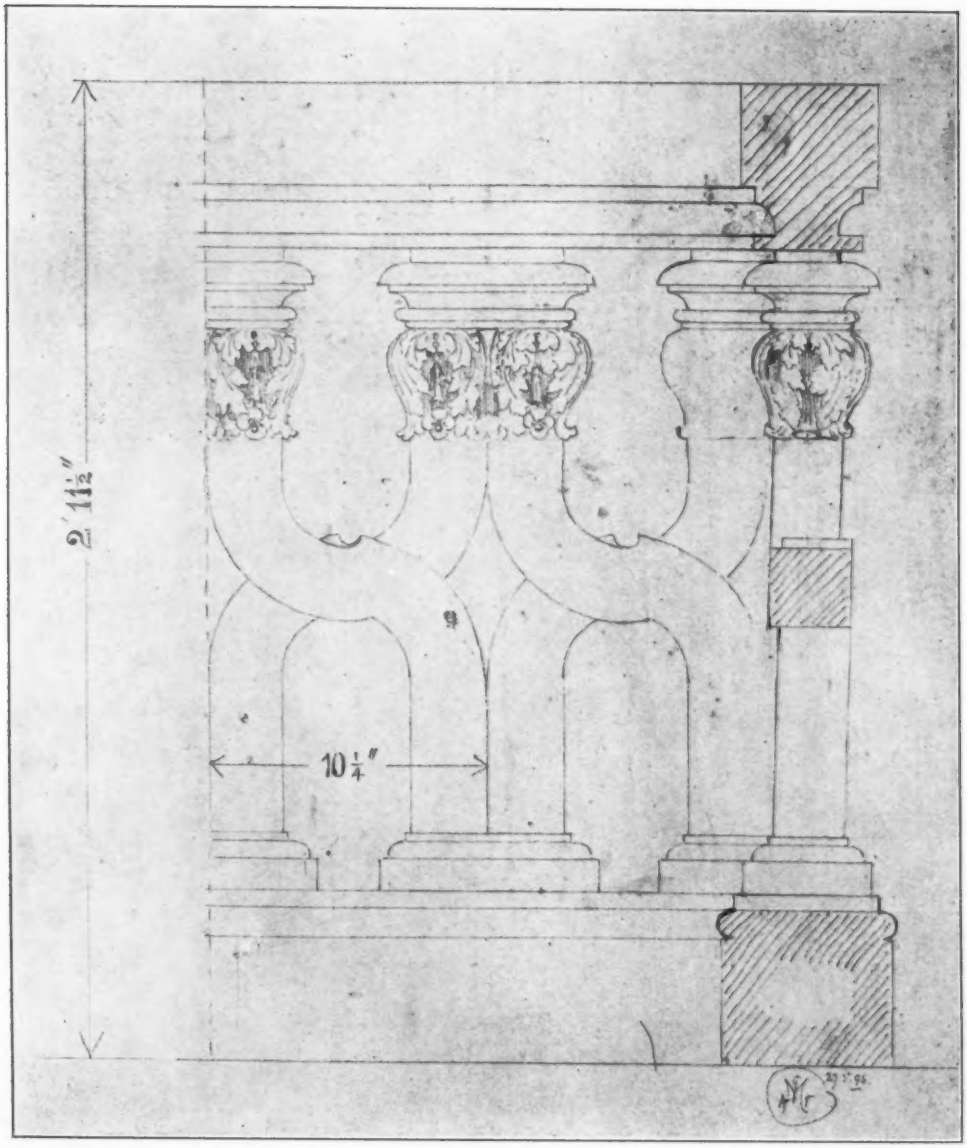


FIG. 54. BALUSTRADE IN THE GARDEN OF THE CLUNY MUSEUM, PARIS.

man period, but several liberties are taken, as, for instance, in giving fins of acanthus to the dolphin. The treatment of another Italian capital, Fig. 51, taken from a door of a private chapel in one of the Genoese churches, again illustrates the point that the Renaissance workers adopted the old Classic tradition of the acanthus, but used it in a new spirit, inventing many different forms of capital in which it could be employed, yet all variations of the Corinthian or the Composite. In this case the curve of the serrations along the leaf are similar to those which are found in the little Romano-Gallic Baptistery at Poitiers,

illustrated in Fig. 46, only here each triplet of serrations forms a lobe of the leaf.

A quite distinct and much more free treatment of the acanthus is that upon the well-known Marsuppini tomb at Florence, a portion of which is illustrated in Fig. 52. It is here treated as a natural wild plant, in low relief and ragged in outline, arranged with little formality, but with a great deal of freedom and swing, and rising from the foot of the monument as if it there grew direct from the ground and terminated in scrolls which carry flowers. Connecting tendrils are carried across and across from one main stem to the other. This has been called a good example of an indifferent period, and perhaps it is a false art to work in so entirely natural a manner, but the execution is marvellously fine, and the effect, at any rate, is pleasing, even if it be a trifle overcrowded. In this case the serrations are more or less spiky in their nature.

A suggestion that the acanthus might be used in the form of a freely designed scroll is found in the cornice enrichment of some Greek temples (see Fig. 35), and again in the scroll at the base of the Roman candelabrum illustrated in Fig. 43. This suggestion was adopted largely during the Renaissance period, both in Italy and elsewhere. There is an exceedingly beautiful example, though it is by no means an isolated one, in the scroll which enriches the architrave surrounding the principal door to the well-known Miracoli Church at Venice. The base of this is illustrated in Fig. 53, showing how the scroll rises from a cluster of acanthus leaves, and is itself formed of a winding tendril from which leaves and flowers spring. The same sort of thing was adopted in many other instances, and in all countries where the Renaissance style was employed. An exceedingly fine and well-known example is the similarly placed scroll in the architrave of the great door to the Church of the Madeleine at Paris. In spirit the principle is exactly that of the Miracoli scroll, but the tendril is less obvious, the acanthus leaves covering the whole surface and being closely intertwined and executed in comparatively high relief, in this case in black marble in contradistinction to the white marble used in most Italian examples.

It is not necessary to give many examples of the use of the acanthus outside Italy during the period of the Renaissance, for it is difficult to find anything that is fresh, but perhaps it may be of a little interest to illustrate two typical French examples. Fig. 54 shows the balustrade of the garden of the Cluny Museum, Paris, and indicates that, while the acanthus retains its old characteristics, it is here employed in a new position. The workers of the time were willing to use it in other than traditional circumstances. Whatever criticism one may pass upon the general design, one is compelled to admit that the acanthus work is satisfactory, but it displays no new variation. This is not the case with it as employed on the choir stalls of the Cathedral of St. Omer, near Calais (Fig. 55). A great deal of carved oak and mahogany of this type is to be found in French churches, generally in such fittings as choir stalls and confessional boxes. It belongs to the later debased period of the Renaissance, during which time a great deal of ormolu decoration was also produced of the same description. The ornament has comparatively little relation to the shape of the object which it is intended to embellish, but appears as if it were thrown on openhandedly, and its principal characteristic is the acanthus foliage with which its many twists and volutes are enveloped. There is little connection between one leaf and another, but the leaves are applied for enrichment only. They are rounded in their character, but that they are those of the acanthus is perhaps as much as can be said. It is not always possible to recognize the original plant in its representation at this time. In the particular example of which a sketch is given, there is a plain leaf enriching the lower part of the division between the stalls.

G. A. T. Middleton, A. R. I. B. A.,
Past Vice-President of the Society of Architects, England.

Warehouses

THEIR PLANNING AND CONSTRUCTION.

The rapid change in growth and in business methods, during the past decade, has been nothing short of marvelous. In no line has this change been more marked than in the storage warehouse business. Especially is this true in large cities, where congestion in mercantile districts, real estate values, and limited available railway and dock frontage enables the merchandise to be more quickly and readily handled through the warehouse.

Commercial requirements have called for such an advanced stage in storage warehouse construction as to cause apprehension, in some localities, on the part of the public warehouseman.

The use of the public warehouse for storage of all commodities and the trend in this direction implies certain conditions necessary for fulfillment by the public warehouseman. Such standards calling for a high grade of buildings, establishes a close competition, quite plain to the warehouseman, and he realizes that to meet these demands, all future buildings must be erected accordingly: He must offer accessibility in location; modern conveniences for prompt handling of goods; the lowest possible rate of storage charges, and of fire insurance; and above all, he must produce a building of such modern fire-resistive construction and so safe-guarded against fire dangers, as to afford guarantee of absolute safety to merchandise while in his custody.

From the viewpoint of the patron of the warehouse, it may be conceded that the forenamed demands are not unreasonable. The proper safe-guarding of his goods, especially against fire, is the very life of his trade.

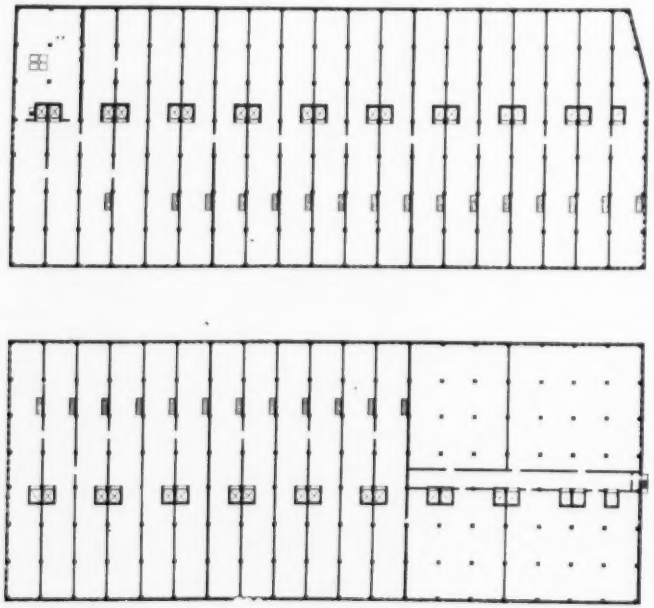
This established competition is quite plain to warehousemen, and they realize that future buildings must be constructed accordingly; the point of anxiety, therefore, lies in the inability of the average warehouseman to know exactly the proper type and nature of building he must erect. He cannot afford to make any mistakes.

There was a time when so-called mill-constructed or slow-burning and semi-fireproof buildings, covered all requirements. Such buildings were looked upon as model structures. To-day, without automatic sprinkler protection and other means of fire safeguards therein, these types are not even in the competitive class. With all modern means of protection, the demands are for something superior.

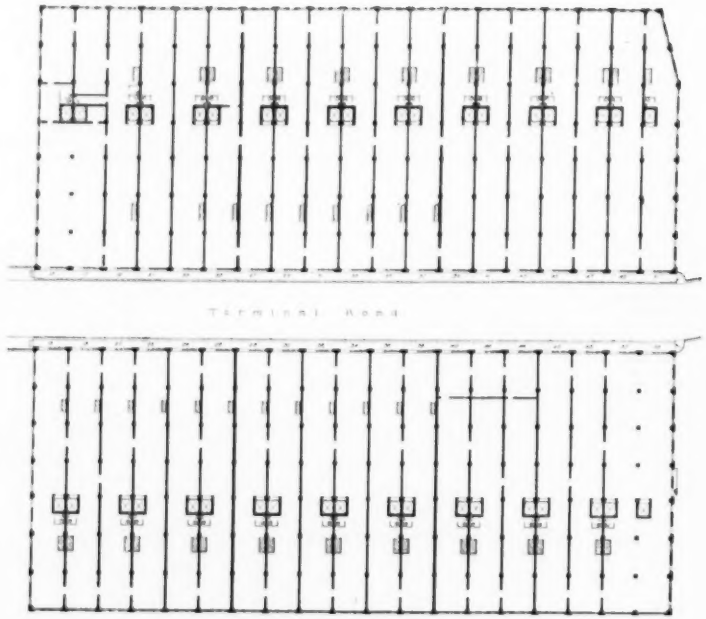
Thus we find the situation, with reference to warehouse construction, similar to that of hotels and office buildings: The public and the trade are demanding every possible convenience, every possible safe-guard against loss of life, loss by fire, or by other means of destruction.

The foregoing statements relate more particularly to the erection of new structures. Many of the existing buildings built during recent years are too valuable and too systematically and satisfactorily adapted for their purposes, to be removed and replaced by the incoming structure of an ideal type. Competition, however, may require that where possible, these must be modernized, and this may be done, in many cases, at a moderate expenditure.

If owners of such properties should investigate the existing individual fire hazards and protection incident thereto, they would consider seriously the advisability of improvements. It may be found, in a large number of instances, that by sub-dividing great areas by brick fire walls; by properly protecting vertical floor openings, such as elevators and stairways; by added protection from outward exposure; by separating the common from the hazardous commodities; and, by equipping the premises with an approved automatic sprinkler equipment, such properties could be so modernized as to fill present and near



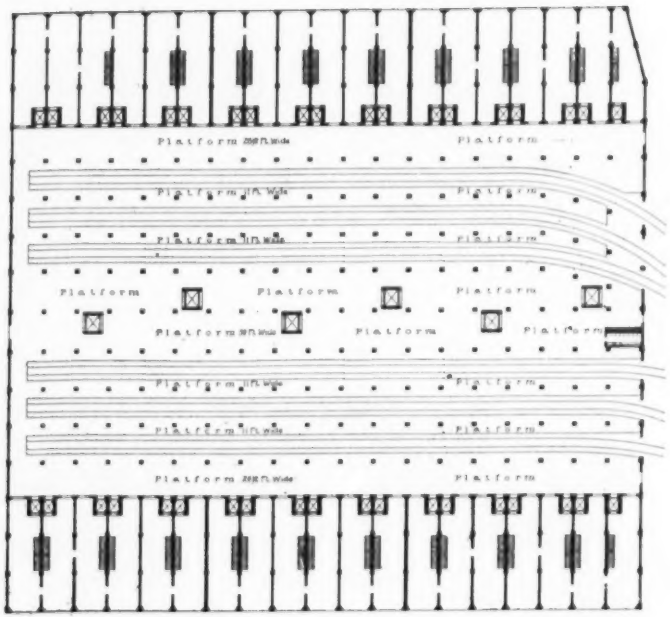
Fifth floor plan, showing separate storage rooms, also some of the cold storage rooms. Everyone of the latter is properly insulated, sanitary, and fitted up with conveniences for the storing and handling of perishable goods.



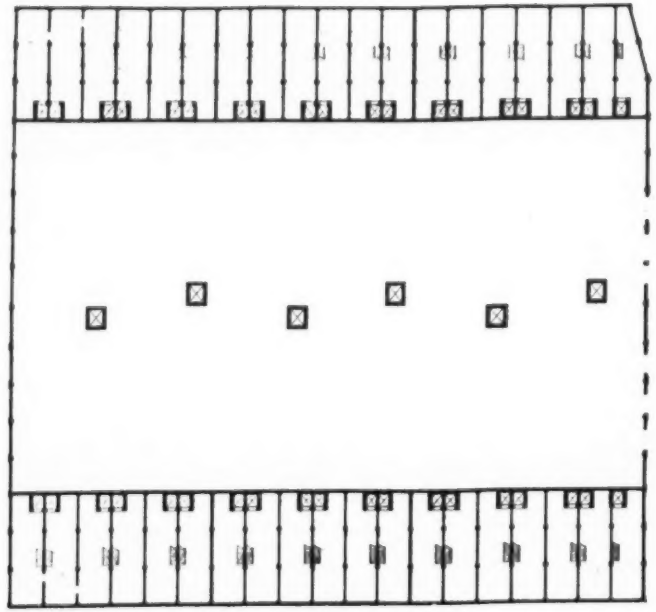
Third floor plan and terminal road, showing manner of access to storage sections from the main terminal.

PITTSBURG TERMINAL AND STORAGE WAREHOUSE COMPANY.

Pittsburg, Pa.

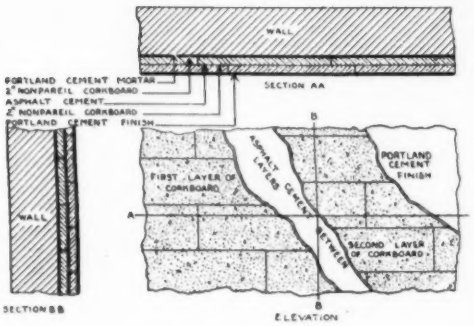


First floor plan, showing the arrangement of the railway service platforms.

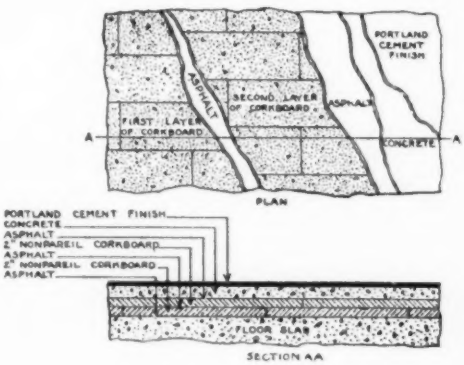


Basement floor plan.

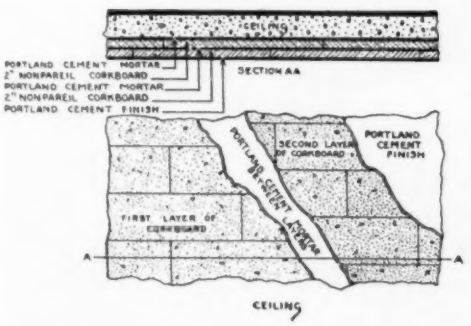
PITTSBURG TERMINAL WAREHOUSE AND STORAGE COMPANY.



Detail of four-inch cork insulation of two layers, in connection with brick, stone, concrete or hollow tile walls.



Detail of four-inch cork insulation, two layers, concrete finish, in connection with hollow tile or concrete floors.

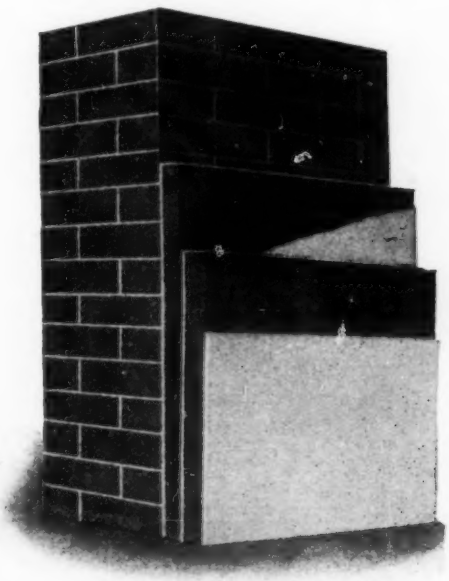


Detail of four-inch cork insulation of two layers, in connection with concrete or hollow tile ceilings.

future requirements. The fire risk could thus be reduced to a minimum.*

Public storage warehouses may be considered as comprising three classes, viz: Cold Storage Warehouses, General Merchandise, and Household Storage; the freight houses or warehouses of Railroad and Steamship Companies, belonging to a separate class, are not treated under this article.

These three classes are distinctive with respect to adaptibility of building for their respective occupancies. The cold storage warehouse requires that especial

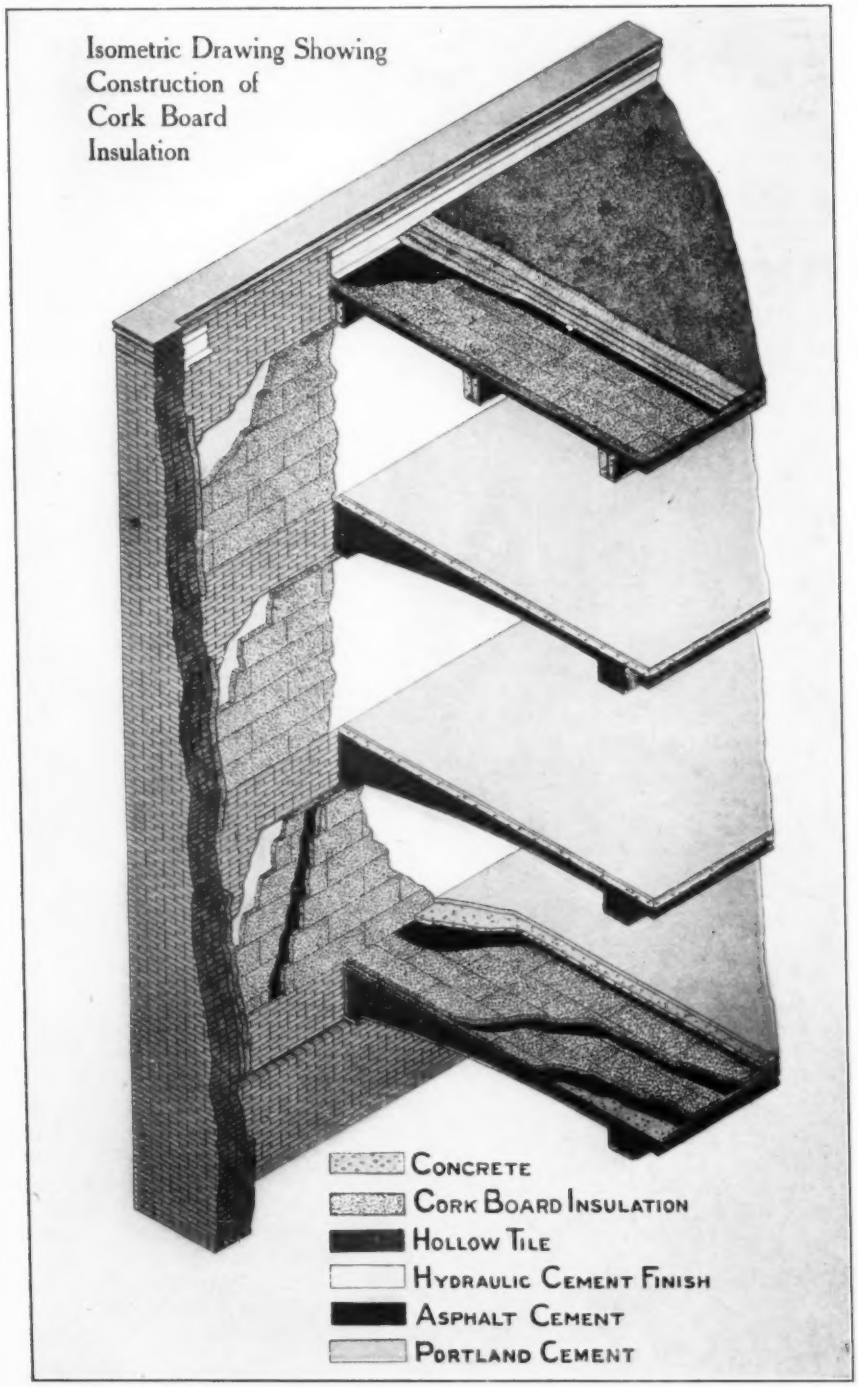


The type of construction approved by the Underwriters.

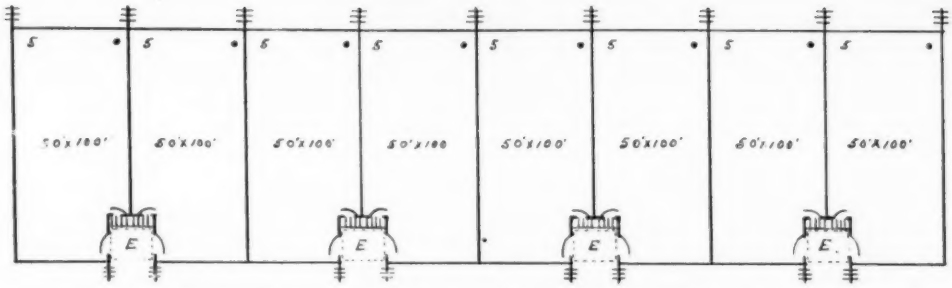
recognition be given wall, floor, and column insulating properties, and conservation of cold air. A building to be occupied exclusively for the storage of household furniture, may require higher ceilings, many small compartments, but lighter column and floor supports, than a general merchandise warehouse.

Respecting adaptability for use, as above mentioned, there may be but two general types of structure worthy of es-

*The various Underwriters' Inspection Offices, and leading architects, no doubt, would gladly give suggestions for the improvement of the fire risk in all such buildings.

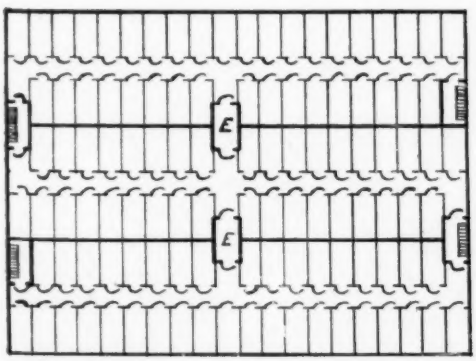


A MODERN AND APPROVED METHOD OF INSULATION FOR A COLD STORAGE WAREHOUSE.



A plan of eight warehouses, of 5,000 sq. ft. each, showing elevators and stairs in an outside shaft. Passage from one section to the other is gained by passing over an iron grating in outside shaft. A fire escape is placed on opposite side of each section, so as to comply with Building Code. This is an arrangement for buildings of mill construction, equipped with sprinklers.

pecial mention, as being suitable in all respects for a modern standard warehouse. Ranking first, is the modern fireproof building, a protected steel skeleton building having brick walls, tile or reinforced concrete floors without wood surface, similar partitions and roof, without interior or exterior wood trimming or frame work. This includes standard shafts with fire coverings for elevators, stairways, and all vertical openings; also the proper safe-guarding of outside wall openings from exposure. In brief, a model fireproof building. Experts differ as to the relative value of tile or reinforced concrete. As to the superiority of a steel frame structure with tile or concrete insulating properties, as compared with reinforced concrete construction, in a building of modern height, it is not the purpose of this article to offer comparison. Reinforced concrete is in a secondary stage of experiment, and when this form and practice is standardized, there is a strong belief that it will hold its own with the protected steel frame type, at heights practicable for its use.



Floor plan of fireproof household goods warehouse, showing arrangement of fireproof compartments, fire doors over openings into same, and arrangement of elevator and stair shafts. The receiving and shipping conveniences are on the first floor, in the central part of building. Elevators are large enough to carry a moving van.

The second type of construction in warehouse building, that of mill or slow-burning, may be considered under certain conditions, with some restrictions with regard to height and area. This will be touched upon later in this article.

The modern fire-proof building appears to have no general limited restrictions as to height, such as govern structures of mill or joist types. The greater the height of the building the more considerate should be the question of limitation of individual area. This pertains particularly to the vertical opening hazard, such as elevators and stairways; the great and unlimited areas, and unprotected vertical openings being largely responsible for the extensive damage from fire in fire-proof buildings. Combustible goods will burn, whether stored in a fireproof or frame building. Fire will destroy anything, give it enough fuel, draught and continuous lines to follow; but confine it within a limited space, within non-combustible enclosures of proper resistive quality, and the damage beyond that to the combustibles therein, usually will be nominal.

It is wise, however, not to exceed, say,

eight stories in height, nor to go beyond a floor area of 10,000 sq. ft., for warehouses. The area, in fact, should be no greater than 5,000 sq. ft. without standard fire-proof partitions, and even this is rather large for highly combustible goods. With an approved automatic sprinkler equipment, the area may reach a greater limit in individual instances.

Claim may be advanced by architects and builders that this is too costly and somewhat unnecessary. To illustrate that small area limitation is advantageous, reference is made to the compactly built property of the Pittsburg Terminal Warehouse & Transfer Company, Pittsburg, Pa. This plant for conveniences, compactness, construction, traffic facilities, protection and insurance, is perhaps one of the most effective of warehouse properties. The main plant is of modern fire-proof construction throughout. It is divided by fire walls into seventy odd vertical fire sections of six stories each, their dimensions averaging 20′ x 158′, or 3,200 sq. ft. for each room. This makes about 400 individual fire-proof compartments. There are really fewer compartments than this, owing to the space devoted to cold storage, offices and power plant facilities, although the individual storage sections are separated in this way, permitting of several hundred compartments, divided in the manner described.

MERCHANTS' ICE AND COLD STORAGE COMPANY.
Cincinnati, Ohio.

Seventh floor, showing top ceiling insulation. Insulation of 30-degree rooms is erected on top of concrete forms. Concrete is applied directly to insulation, and the insulation plastered after forms are removed.

The height of this building is six stories and basement. The elevators and stairways are in fire-proof shafts, cut off at the various floors by automatic operating fire doors. The premises are equipped with automatic sprinklers, other

auxiliary fire protection, and excellent watchman patrol service. Railway and river facilities are at hand. The outward exposure is guarded.

With all these modern conveniences, construction, protection, and a low insurance estimate, the plant in question may be said to meet all modern requirements. The operators of this property publish an endorsement from the Chairman of the Committee on Construction of Buildings, of The National Board of Fire Underwriters, to the effect that the property in question is of the most thoroughly fireproof nature that has come to his attention. This plant is worthy of a careful inspection and study.

THE BUSH TERMINAL COMPANY'S PIERS, WAREHOUSES AND RAILROAD YARDS.
South Brooklyn, New York.

The immense plant of the Bush Terminal Company, South Brooklyn water front, New York, is an example of the development of the warehouse industry. Its many buildings, piers, docks and terminals cover about 200 acres of ground, comprising the largest single warehouse plant in the country.

The warehouse buildings of this concern are well divided into groups, which, in turn, are subdivided by fire walls. The general type of construction of the older buildings is of the mill order, while the buildings erected during the last few years and those now in course of erection are of steel and reinforced concrete construction. Most of the buildings are equipped with approved automatic sprinkler protection, and in addition to this is a private fire main and hydrant system throughout the yards of the plant. The buildings are well separated, so that should one of them burn it is hardly probable that fire would communicate to any of the others.

The Bush Terminal Company is now promoting the erection of loft buildings at their plant for shippers and manufacturers. The first one of its kind is about completed, and appears to be a model in all respects. It is of fireproof construction, six stories in height, and is subdivided by fire walls into many independent fire divisions. The property is being protected with automatic sprinklers. It is the intention to have buildings of this nature occupied for general storage purposes and for all kinds of light manufacturing. The quick and convenient manner of receiving, handling and shipping raw products enables the manufacturer to turn out his finished product without the necessity of rehandling it, as would otherwise have to be done.

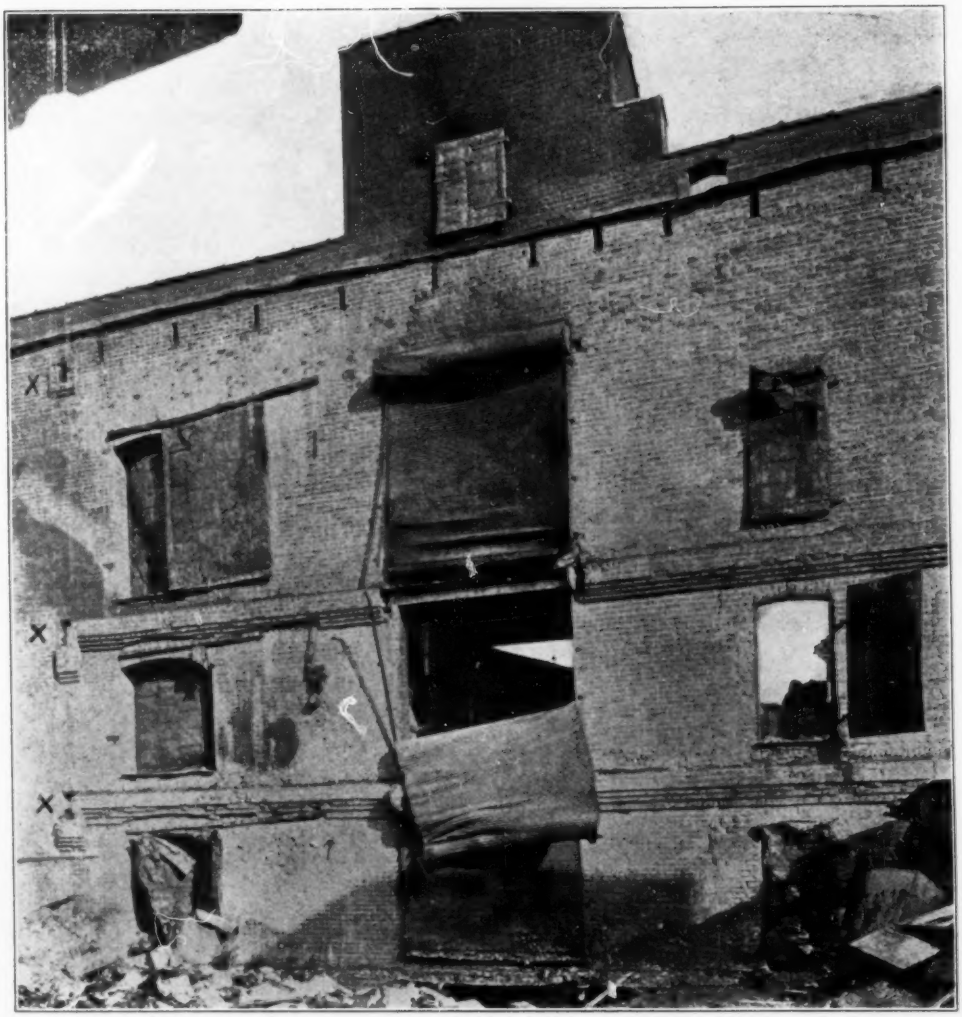
Modern cold-storage warehouses of

fireproof construction mark a wonderful improvement in that branch of the storage industry. In a modern standard structure the fire risk is of a minimum nature. Present means of wall, column and floor insulation practically remove the fire hazard formerly common in sawdust and paper and wood-packed enclosures. The many modern methods of insulation of cork and fiber products are so well installed as to properly confine temperatures, their presence in the structure itself rather tending to serve as a fire retardant thickness to building parts. The modern building is entirely of fireproof construction, and has all vertical openings in cut-off fireproof shafts well vestibuled. The refrigerating plant is in a detached fireproof building, and in many instances has two and three separate sources of refrigeration.

VIEW OF A DESTROYED SECTION OF THE COBURN WAREHOUSE.
Indianapolis, Ind.

The circulating cold-air distributing system is giving way to the direct-expansion method, thus eliminating ducts and recesses throughout the building. There must be no unprotected openings from floor to floor, as some means of cold-air processes permit. For economical reasons, small areas or compartments are desirable, in order to maintain proper temperatures. Care should always be taken to completely insulate all compartments, particularly the columns and partitions. The failure to do this, owing to many necessary changes in temperature, will permit dampness or moisture to gather, which is objectionable. Heat is not essential. The entire lighting system should be carried in metal conduits. The outward exposure is almost eliminated by the solid walls required for structures of this class.

Close attention to the foregoing injunctions leaves but little in the way of fire risk. Warehouses of this type may be found in Warehouse "C" of the Sheriff Street Market & Storage Company, Cleveland; the Merchants' Ice & Cold Storage Company, Cincinnati; the Pittsburg Terminal & Warehouse Company,



Coburn Warehouse fire, showing the fire doors on the wall between Sections "D" and "G." This view shows that the automatic door on the fifth floor closed only half way, and the one on the fourth floor failed to close at all.

The girder holes shown in the wall at the left of these doors and marked X, X, X, extend entirely through the wall without any intervening brick partition. It was undoubtedly through these holes that the fire gained access to the upper floors of Section "D," particularly through the one on the second floor, directly under those shown.

Pittsburg, and at Boston, Chicago, Jersey City and Detroit.

Warehouse buildings of the mill-constructed type, without automatic sprinkler protection, have proved somewhat disappointing to owners who have suffered from fire therein. Underwriters have also many times over-estimated the fire-resistive properties accredited to this class of construction. As a result of assuming large lines of insurance on and in buildings of the mill-constructed order, insurance companies have been called upon to pay dearly for their experience.

Extensive fire losses in mill-constructed buildings are largely due to faults in the buildings themselves. Common and

serious mistakes are often made by failure to carry out requirements or specifications necessary, in detail, for the reasonable protection of a mill-constructed building. In such buildings, for example, it is often found that the elevator and stair shaft is far from standard; that the fire doors to openings therein are but makeshifts, or the owner has permitted an open stairway or chute to pierce two or more floors. Perhaps the elevator walls do not extend through the roof. The architect or builder has failed to make the floors waterproof, and has not provided scuppers. The height permitted for buildings of this type is overreached. The area permitted is too great. The beams and girders are improperly set. The proper wall thickness is deviated from. The heating, ventilating and lighting systems are improperly installed. Division walls are not of standard thickness, and the fire doors over openings therein are not of an approved type, or the building may not be properly protected from outside exposure.

Many of the foregoing important features are sometimes given too little attention, and failure to observe them is largely responsible for the rapid spread of fire in buildings of this class.

An example of omissions was shown by the destruction of the Coburn Warehouse, Indianapolis, January 29, 1908. In this case the builder failed to carry out the details of construction evidently originally planned. The property in question was occupied for the storage of general merchandise, the building being five stories and basement in height, with total grade floor dimensions of 150 x 270 feet. The building was subdivided by fire walls into nine equal parts. The en-

COBURN WAREHOUSE.

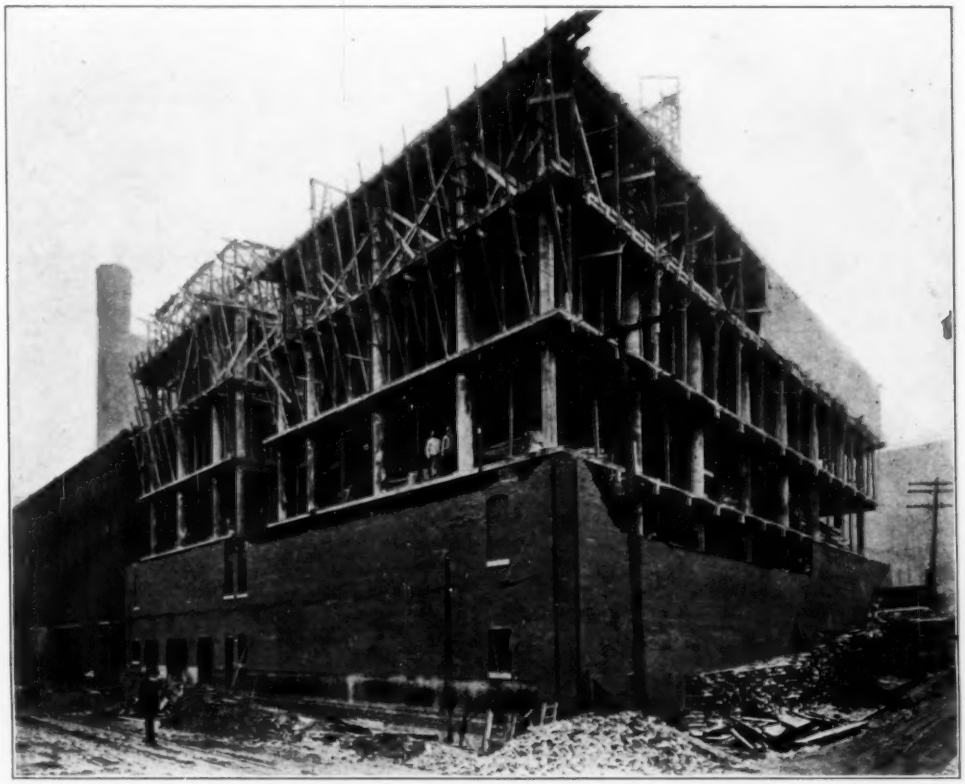
Indianapolis, Indiana.

This building was of mill construction. The flames swept through the main sections of the property without resistance from the heavy floors and supports of the structure.

tire structure gave evidence of having originally been intended as one of standard mill construction. Departure from the standard, however, was responsible for the rapid spread of the fire, which destroyed about one-half of the building sections and a larger percentage of the stock. In this instance, the division walls were not standard; the fire doors were of an unapproved type; unprotected vertical openings existed, and the openings in walls made for the girders to rest upon extended clear through without intervening brickwork.

These variations from the standard were responsible for the rapid and destructive progress of this fire. Following is a summary contained in an official report of this fire:

"This fire has again demonstrated the unreliability of steel rolling doors as a fire retardant—the necessity of standard fire doors on both sides of openings in walls; that girders, as well as floor beams, should be carried on corbels or pilasters, or should have at least eight inches of brick between ends of timbers, where the latter are inserted in walls; that openings in fire walls above roof, for purpose of drainage, nullify the value of such walls as fire cut-offs; that all floors in buildings of this type or other good types of construction should be provided with scuppers of ample ca-



ST. LOUIS REFRIGERATING AND COLD STORAGE COMPANY.
St. Louis, Mo.

A cold storage warehouse in course of construction, showing interior concrete construction and outside curtain walls, just started. The ceiling of third floor is insulated with three-inch cork board, laid down in the forms before the concrete is poured in. The wall insulation is to be continuous. This warehouse, when completed, will undoubtedly be the most scientifically insulated building yet contrived.

pacity; the necessity of metal flashings at floors around posts and at walls; and last, but not least, that buildings of so-called full mill construction burn almost as readily as buildings of inferior design, and that all risks similar to this should be provided with sprinkler equipments. Stock should not be piled in front of windows, and never within 24 inches of wired glass windows. This, and our past experience, has clearly shown the necessity for the development of a more efficient type of fire door."

Another example of destruction of a slow-burning building is that of the Hower Building, Akron, Ohio, which burned, May 18, 1909. So convinced were they by the supposedly superior type of construction that underwriters accepted unusually large lines of insurance on and in that building. To their amazement, the fire completely wiped out the entire structure, which was a fairly good specimen of so-called slow-burning construction. In height, it was four stories, basement and two sub-basements. The grade floor area covered 13,875 square feet. The walls, floor supports, floors and all other structural features gave evidence of good construction. The elevator and stairway was in a brick shaft, having all openings protected by automatic sliding and steel rolling fire doors. The building was occupied principally for storage, with several light manufacturing concerns on lower floors.

The fire in question started in a lower floor of the building and rapidly gained headway to upper floors, the large undivided area of structure allowing the flames to spread laterally. Whether or not the upward rapidity of flames was

MODEL COLD STORAGE PLANT OF THE MERCHANTS' ICE AND COLD STORAGE COMPANY. Cincinnati, Ohio.

This is of modern fireproof construction, and divided into three separate fire divisions.

due to the failure to operate of fire doors on elevator and stair shafts is not known. However, this, the absence of individual fire protection and inability of the fire department to cope with the fire, owing to its magnitude upon the arrival of the apparatus, are given as reasons for the rapid destruction of the property.

These are but two of many instances illustrating that buildings of the slow-burning mill type will burn just as readily as those of an inferior design once a fire has gained headway. To reduce or eliminate the possibility of fire in mill-constructed buildings reaching a magnitude of extensive destruction, great care must be given to the constructional details.*

Owing to the variety of goods stored in a general warehouse, it is advisable to construct a building for that purpose so that all such articles as oils, acids, rags, cotton and others known to warehousemen and underwriters, may be placed in separate sections. Spontaneous combustion is an evil which enters largely into the hazards of warehouses. Care should be directed toward examining all articles of storage, and known commodities of this class stored only in connection with articles which might in no manner create a self-igniting combination.

The United States customs regulations pertaining to storage buildings suitable for goods while in bond appear to be extremely weak. These regulations should be revised and made more rigid. In justice to the warehouseman who has gone to the expense of erecting a model fireproof storage building, he is discriminated against by the government permitting goods in bond to be stored in buildings of the most ordinary type.

The government regulations were, no doubt, intended to apply to buildings of mill construction, or better. However, as they now read they are somewhat ambiguous and place too much discretionary power into hands of local representatives as to their intended application. The customs regulations of 1908 read as follows:

"Article 482, Page 226, Application to Bond.—In order to establish a bonded warehouse, the owner, or lessee, shall make application in writing to the Collector of the Port, describing the premises and location, and stating the class of warehouse which it is proposed to bond.

"The application must be accompanied by a certificate, signed by the president or secretary of a board of fire under-

Murphy Ice and Cold Storage Warehouse Co. Detroit, Mich.

writers, where such board exists, and at other ports by the proper officers or agents of two or more insurance companies, that the building offered is a suitable warehouse, acceptable for fire insurance companies. The Collector will thereupon direct the Superintendent of Warehouses to examine the premises and report in writing the particulars relative to the location, construction and dimensions of the building, the means provided for the safe keeping of merchan-

*The standard for buildings of mill construction, as recommended by the National Board of Fire Underwriters, is an excellent basis to closely observe.

dise, whether the building is separated from adjoining buildings by walls in which there is no door or other openings, and all other facts bearing on the subject.

"On receipt of such report, the Collector will transmit the same to the Secretary of the Treasury, together with the application, the insurance certificate and an expression of his views thereon."

Also, on page 228, Article 489, pertaining to fires, lights and locks, is the following:

"Fires shall not be permitted in any warehouse, except in the business office; and where lights are required, safety lanterns or electric lights only must be used. All the doors and other fastenings of bonded warehouses must be secured by customs locks of different pattern from those of the proprietor."

It would appear from the foregoing regulations that, as an inducement to encourage superior construction of warehouses, the government should be requested to establish requirements that would be more in keeping with modern types of warehouse construction. The American Warehousemen's Association could, no doubt, lend much influence to this end by applying for a revision of these regulations.

The third class, or warehouses for storage of household furniture, should receive careful consideration. This class is accredited as having an exceptionally unfortunate fire record. This record may be due to the fact that, until recent years, buildings of inferior construction were almost generally used for the storage of household furniture.

The nature of the property stored presents conditions favorable to causing a fire by spontaneous combustion, from such sources as that of concealed oily rags, oils, chemicals or matches. There is no reason, however, why this unsatisfactory and hazardous condition should not be overcome. Great improvement is shown by recently erected buildings of fireproof construction, with stairways and elevators in separate shafts, having openings at each floor protected by standard fire doors. Each story is divided by fireproof partitions into separate storage rooms, openings into such rooms protected by standard fire doors, so that any room can burn out without communicating fire to adjoining rooms. The whole premises are protected by automatic sprinklers, with floors arranged so that water from the sprinklers, in case of fire, will drain outside of the building. The wrapping, packing and crating and boxmaking rooms are also in fireproof compartments.

Household furniture storage warehouses of this construction, arrangement and protection should strongly appeal to the man who desires to make use of his domestic values after once having placed them in storage.

Architects and builders frequently fail to recognize the real importance and significance of standard fire doors. They should discourage, as far as possible, openings in fire walls. Fire-door protection of the vestibuled design is the best method to employ, particularly in buildings containing hazardous and highly inflammable goods. Fire doors of an inferior type are of no value. The best fire door that can be made is none too effective, and even then, if improperly hung, finds its efficiency destroyed.

Consider, for instance, that a building is divided into two sections by a 16-inch fire wall (this fire wall is intended to establish two separate fire sections of the building); assume that, for convenience, it is desired to cut a passage or doorway through the wall on each floor. By doing this the wall loses much of its efficiency as a fire stop, notwithstanding that the openings are well protected. No substitute can be made that would make the wall as sound as it was formerly. Fire may not penetrate an opening protected with standard double fire doors, but there is an element of smoke and water hazard that cannot be overcome. The susceptibility to damage from smoke and water may be greatly lessened by providing only such fire doors as the experience of years, by skilled fire protection engineers, may recommend. It is a useless expenditure to install any other type of fire doors.

The Underwriters' Laboratories', Inc., directed by the National Board of Fire

Underwriters, after experiments and tests of several years, recommend a type of standard fire door. They recognize its complete construction and setting only under the most rigid tests. The manufacturers of the door must first qualify as to his ability to make such a door: that he can properly cover it; that he can procure approved hardware and fittings, and properly place or hang the door. Coupled with this, must be a guarantee that the manufacturer will make all doors in accordance with such requirements. Once fully qualified, the manufacturer's name is placed upon an approval list of concerns that can satisfactorily make fire doors of real value.

These doors are inspected by agents of the laboratories and labeled with an approval tag, fastened to the door; nor will the various underwriters' inspection offices recognize other than these labeled fire doors. This approval carries with it a guarantee that the owner is obtaining that for which he is paying, and that the real value of the doors will be recognized as a suitable fire retardant by underwriters.

The same approval system is followed by the Underwriters' Laboratories, with respect to wire glass windows, fire appliances and structural parts.

The greatest care should be followed in contracting for fire doors, and none but those of a labeled type considered.

The requirements of this article will not include the details of construction for the various classes of warehouse buildings. Future warehouse patronage, however, will unquestionably require buildings of the very best types of fireproof construction that may be devised. Prospective builders, as well as architects, may bear this well in mind and not erect what they want, but that which patrons of warehouses will require of them.*

Charles H. Patton.

*The illustrations accompanying this article outline many of the salient features to be observed in warehouse construction.

SANATORIUM OF DR. WARDA.

Blankenburg, Thuringia. Albert Gessner, Architect.

GLASS

Its Adaptability in Building

Much of the matter which is being presented in these pages has for its ultimate object the closer cooperation between architects and the building public. It is chiefly through the influence which architects are able to exert upon their clients that better designed and planned buildings can be achieved, better methods of construction employed and more thoroughly honest building materials incorporated. This closer relation between architect and client of which we speak is, however, not the sole means of producing better results in our architectural endeavors. The closest understanding between architects and builders, meaning thereby purveyors of building materials as well as constructors, is quite as essential if lasting results are to be achieved. It is no more important for the success of a building operation that the builder or constructor should be able to understand the architect's ideas as they are conveyed to him through the convention of geometrical drawings, in writing and by the spoken word, than that the architect should have a "judging" knowledge of the nature of the materials and processes which he is specifying and in which he is planning.

It is for the purpose which has been briefly stated above that the following article is presented on the subject of glass, a building material with which architects are not generally as familiar as they might be. It is only to straight glazing that reference is here made, as decorative or stained glass work is really a field by itself, in which architects take no active part, providing only the setting and selecting the proper artists to supply the designs. Nor do most architects take a much livelier interest in straight glazing work. The usual practice seems to be to specify window or other plain glass in a very vague way and to trust that the proper kind and quality will be supplied—sometimes a very unsatisfactory method, especially when the glassman is ignorant of the precise conditions which are to be met in the job.

For the architects' purpose it is not, of course, necessary to go into a minute technical account of manufacturing processes. More useful to him is it to set forth the several peculiarities and qualities of the material as it is turned out in its different varieties and to point out the particular applications of each variety. This is the method which Mr. Bostock has followed in his presentation. The article is intended to be of a thoroughly practical character.—Editors.

All sheet glasses, which are the subject of this paper, are very similar in chemical composition, being silicates of soda,* lime, lead, nitre, heated in furnaces at temperatures sufficiently high to melt them out clearly. The molten mass is then converted into what the layman knows as glass by one of three processes —blowing, rolling or pressing.

*A fair idea of the composition can be got from the following batch, it being one used in producing a very high grade window glass in a modern natural gas run tank furnace:

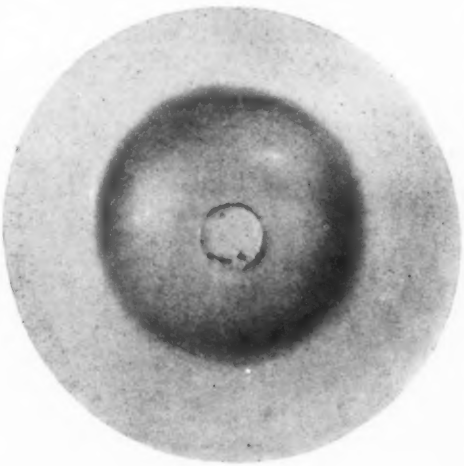
100 lbs. Sand.
39 lbs. Salt Cake (Sulphate of Soda).
30 lbs. Crushed Limestone.
2½ lbs. Ground Carbon.
1 lbs. Arsenic.

The various colors in glass are obtained by adding to the "mix" or batch the necessary chemicals before heating in the furnace—oxide of iron for greens; copper or gold, for rubies; sulphur or uranium for yellows, cobalt for blues.

Glasses to be blown into sheets are now all made in cylinder form, and afterwards flattened out to form sheets, the molten glass being first gathered upon a blow pipe in sufficient quantity to make whatever size sheet is intended. This molten mass is then blown into by the workman to form a ball attached to the pipe by a neck, caused by drawing upon

the pipe at intervals between blowing, and afterwards by successively reheating and swinging in a pit provided for that purpose it is formed into a cylinder of 15″ or thereabouts in diameter and from 56″ to 80″ long. This cylinder is then detached from the pipe, split down its length by a hot iron known as a cracking iron, or by a diamond. It is next placed in a flattening oven to be reheated and smoothed out from this cracked side to a perfect sheet, which may, of course, be cut to any desired size or shape.

Rolled or plate glasses are made by dipping from the pot or furnace upon



A Rondel.

an iron table whatever amount of molten glass may be necessary, and then rolling it to the desired width, length and thickness, passing it down a tempering lehr which, by very slowly cooling it, prevents its being brittle, and then, if necessary, polishing it.

Pressed glasses are made by ladling the necessary glass into a mold and pressing to the desired shape. Their application to building is limited.

Figured or pattern rolled glasses are made by having the pattern cut into the roller, although the process has been varied by having the pattern upon the plates of the table. A following or double roller is also used to some extent. This, by preventing the glass buckling away from the table, produces a very smooth surface.

The subject of the proper use of plain window glass is not so simple a matter as it would seem. Below are enumerated the kinds of window glass procurable from stock in New York City at any time:

American Single Strength 3 qualities
American Double Strength 3 qualities.
French Single Strength 3 qualities.
French Double Strength 3 qualities.
German 24 oz. English 15 oz. English 17 oz. English 21 oz. English 26 oz. English 32 oz.

These glasses are mentioned in the order of their quality, the poorest being first. I should like to put American last and best, but unfortunately this cannot be done, due primarily to the fact that no American manufacturer has yet taken the necessary care and pride in his brand to educate workmen to produce the best results, though the writer has seen glass melted in our natural gas run furnaces superior in the molten state to the glasses of the old world. Several factories have recently been showing signs of awakening to this fact and soon, no doubt, there will result in America substantial developments in the art of glass-making. The secret of inferior American sheet glass seems to lie in the mad rush for maximum of production on the fixed charges of the factory without regard to quality. American single strength glass will run on an average about one-tenth of an inch in thickness and can be used safely against ordinary wind pressures in sheets up to 28″x30″. For weight 18 to 19 ounces to the square foot must be allowed. Double strength runs about one-seventh of an inch in thickness, weighs about 24 ounces to the square foot and can safely be used up to 40″x80″ or 50″x60″, though in practice this is hardly ever done, as usually lights of this size are required in a better quality glass.

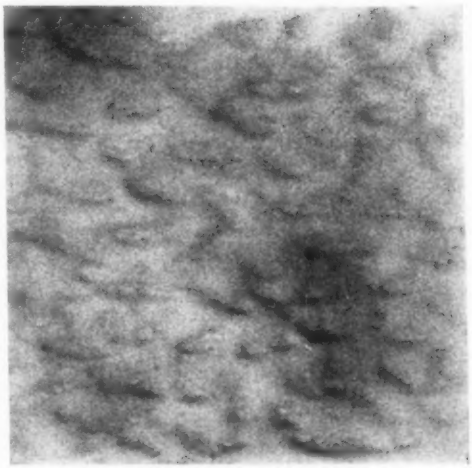
In specifying American window glass, where it is desired to get the best, it is well to specify a natural gas tank-made, hand-blown and dipped brand. Glass made by this process is to be preferred, because the fuel, being very clean and carrying no surplus car-

bon, the surface will not be "burnt," that is, have particles of carbon burnt upon it. Tank-made glass is preferable to that made in pots, because it is now made almost solely upon a salt cake or sulphate of soda base, whereas, to be able to melt fast enough in pots to maintain the high producing rates set by the tanks, manufacturers resort to soda-ash, in varying quantities, as a quick melter, and soda-ash glass is apt to contain some small percentage of "free acid" which in time, and especially in moist atmospheres, will cause the glass to stain and become iridescent, as will often be noted in old buildings. To remove the sulphur deposit of the flattening ovens from the sheets, which has a similar staining effect if left undisturbed, recourse is had to dipping the sheets while hot in a bath of diluted acid. This bath removes the sulphur stains, but not in soda-ash glasses. Faults of workmanship are, of course, apparent in all glasses, but are usually cut into the poorer sizes and qualities.

Hand-blown glass has met a competitor in the form of a new process known as "drawing," patented in 1895 by John Lubbers, of Pittsburg, and developed for the purpose of producing cheaper window-glass cylinders. For several years the product was too inferior in quality to compete seriously with the hand-blown. Recently, however, the process has been very materially improved, yielding fairly good glass, though it can never hope to displace the hand-blown when quality is essential.

French glass ranks next to the American in quality. The best grades will stand all but the most exacting criticism, but it is well to remember that French window glass is thinner than the corresponding single or double quality of the American product.

The best quality of blown glasses are the English, and only the best grades are imported, as their prices are high and it pays to use them only where the best is needed. That most generally used is the 21 oz. The two largest English producers date their existence back into the 18th century and having made it a point all this time to maintain their quality to the highest standard the goods

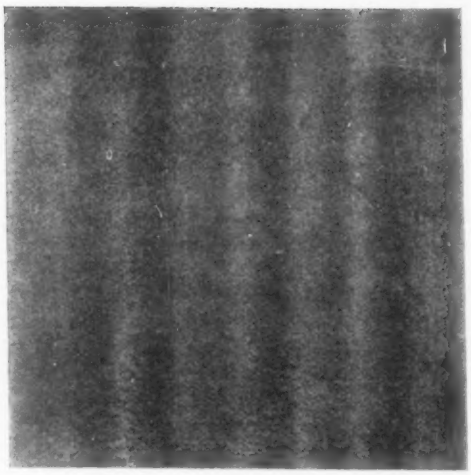


Muffled Glass.

can be depended upon to run uniform and good. Some of the best grades of this glass cannot, in fact, be told from plate glass except by the expert. The English produce so many thicknesses from 13 oz. or Dry Plate glass to 40 oz. or British Plate that it is usual to designate them by the weight per square foot, therefore the expressions 15, 17, 21, 26, 32 and 40 oz. glass.

German sheet glass is in quality about the same as French, but is a very white glass, for which reason it is sometimes used where it is desirable that objects

Crackled Glass.



Fluted Glass, the Forerunner of Prismatic Lighting.

indoors be seen in a perfectly natural light.

American plate glass has developed so rapidly during the last twenty years that, notwithstanding some slight recent retrogression in quality, it is fit for any purpose except possibly for high grade mirrors where the greenish tint of the glass which will show back when silvered makes it desirable to use the French or Belgian plates. There are, of course, all thicknesses of polished plate from ⅛″ to 1″ thick, but the usual glazing thickness is ¼″ and will weigh about 2½ lbs. per square foot.

Chipped or Frosted Glass.

Getting away from the question of plain glass and outside of leaded glass, upon which this article does not pretend to touch, there are many interesting and curious glasses which have a place and value in architecture. Though very few of them are allied distinctly to any time or decorative period there are extant some that have interesting histories. Possibly the oldest glass existing made primarily as window glass is that excavated some years ago from Roman ruins on the banks of the Rhine. These lights, evidently made without the aid of molds, were about 6″x9″, ½″ or so thick in the center and ⅛″ on the edge, and of a greenish tinge. These came into the hands of a famous German firm, which made reproductions so faithfully that only the time stains differentiate them from the originals, as even the imperfections in the old glass arising from the fact that their furnaces could not be raised to a very high temperature, have been faithfully reproduced. These lights have been placed upon the market under the name of "Norman Slabs" and are being used, as witness the entire front of an Oxford street restaurant in London, and in conjunction with other glass in work recently done by a well known American decorative glass firm. Wherever the object is to obscure vision while admitting practically a full light with artistic effect, they are to be recommended.

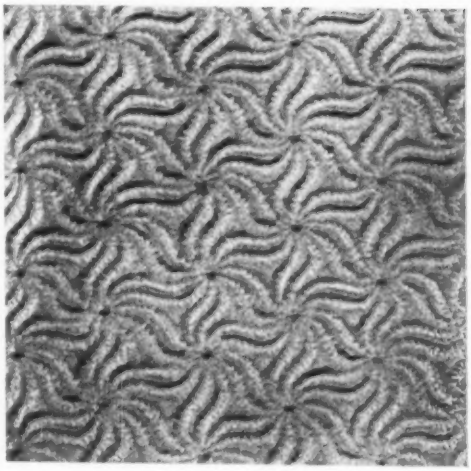
Another interesting survival is that of the Rondel, the oldest known commercial form of window glass, the sheets being obtained by blowing into the molten glass upon a pipe until it becomes a perfect sphere. This sphere is then reattached at the exactly opposite point from the pipe to an iron rod by a little hot glass, the pipe detached and the sphere spun in a furnace till the hole left by the detachment of the pipe flares back to a right angle to the rod, when it is put in an annealing oven with the knot or bullion left by the detachment of the rod. There are to be found in a good many existing windows specimens of this glass and their probable date of manufacture can almost be told by the relative clearness of the glass. As furnaces were built to maintain

higher temperatures, improvement is to be noted in the disappearance of devitrification, striae and blisters. These Rondels were usually of very small size, seldom being found in old work over 4 inches in diameter, and were used with practically all types of mediaeval architecture, surviving most recently, probably, in certain specialized forms of German architecture.

Splendid specimens are to be found in Fraunces' Tavern in New York, the windows of which, with other materials, were brought from the Low Countries, and it is notable that with the restoration of the Tavern a few years ago, it was possible to get again the Rondels, the time stains only being missing.

As the craft gained in knowledge the size of the bullion got larger and, helped by better chemical knowledge, the glass became clearer and clearer, until the beautiful old crown glass was made, reaching the height of its development at the end of the eighteenth century. While the bullion or scar was still upon each sheet, these were now made big enough that lights 14x16 inches, or so, could be cut outside of the bullion and the lights containing the bullion used as a matter of economy and for their decorative effect. Unquestionably the old crown glass is the finest-surfaced glass ever made. Each sheet in the "flash furnace" took a very high fire polish which was never afterwards disturbed, and while it is to-day made only for the bullions, its fine surface can still be there observed. It was the glass of our early Colonial period and can still be found in the remaining houses of the time.

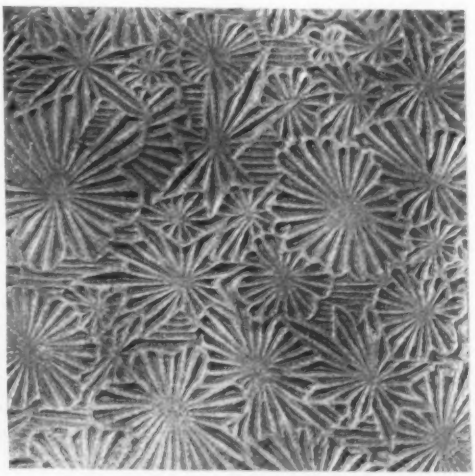
Again, the modern glassmaker is producing antique glass for the glass painter with which any of the old windows can be duplicated. Down through the centuries men were learning here and there by accident and design how to produce a color in glass, all this knowledge being successively handed down until to-day almost any color asked for may be had in antique glass. In this production of color the moderns are perhaps handicapped a little by the many innovations at their command. The old glass made with "kelp" or seaweed ash as an alkali



Iridescent Rolled Pattern.

was so much softer than the modern product that the painter's stain or color seemed to sink into and become a part of the glass with an effect which it is hardly possible to get now; hundreds of beautiful tints and colors are to be had in this glass and are finding an extensive field besides being the basis of all painted work. Cut into quarry work in a tint to suit the surroundings they are very pleasing, there being enough shading in the glass to relieve the dullness of most colored glass.

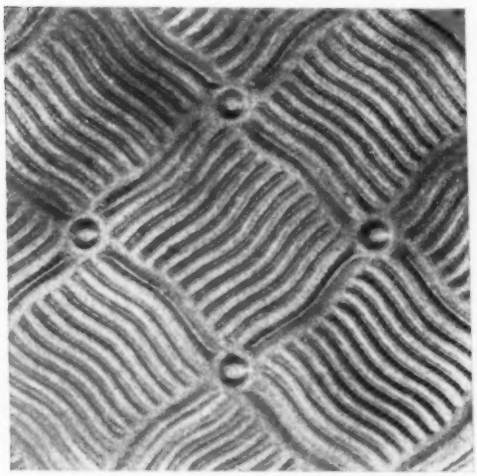
Another survival of these historic



American Figured Rolled.

glasses is the "Ambitty." This is a glass in which devitrification has set in before it is blown, and the sheets are sprinkled throughout with small particles of the devitrified matter. At a short distance from the eye it resembles the modern "antique" glass in its rough texture and can be used in its stead in all decorative schemes and especially in matching a rough surface, as stucco or uncut stone.

As mentioned previously, it has become possible for the modern color maker to produce almost any desired color or tint, and all colors have of recent years been made with a clear, pure hue in sheets as large as 40 x 50 inches. While not so largely used in this era of



An English Figured Rolled Pattern.

leaded glass, they still find use in vestibule, lantern lights, signs and plating. Some colors, notably ruby and green, when blown in solid sheets, are found to be too strong in color, to overcome which it was thought best to "flash" them, that is, to produce a sheet of crystal glass coated or flashed with the color on one side only and by the thickness of the "flashing" produce any desired tint. One firm alone markets seven standard tints in flashed ruby and an infinite variety of tints for special purposes. A great number of beautiful door and partition lights are made from these glasses by etching or embossing away the color to show the crystal glass in designs. During the last few years there have been produced a few colors in double flashes, that is, glasses coated on each side with a color, leaving a crystal center. On these glasses, by etching, it is possible to produce any combination of three colors and crystal in any degree of shading, and as it is appreciated will undoubtedly find larger application.

Another development of recent years is the "Iridescent," or "Favrile," glass, originally brought from England for decorative vases and kindred objects. It was extended to sheet glass, and is now procurable in the open market applied to various colored glasses; it attains its particular beauty when used in a dimly lighted position, as in inside vestibule doors. In a full light the iridescence becomes visible only at an acute angle.

Ground glass, made first in 1870, is used, when it is desirable to exclude all vision, and from it is made the frosted or chipped glass used in partition work and in working out designs.

While sheet glass of any color is, of course, procurable; one color little understood is black. This finds its chief use in the production of false windows, where the color stops all vision, and yet its surface, being highly glazed, gives almost a complete deception if viewed at an angle.

Another peculiar type of glass is the "sanded," usually seen in ruby and crystal, though produced in any desired color. The sanded effect is got by dusting upon the surface of the glass, while still hot, in the "flattening oven" a quantity of fine sand, which adheres to the surface, giving a peculiar antique effect. It is especially effective as a background to throw designs or letters into relief.

All the glasses thus far mentioned are blown and have the smooth fire-polished surface characteristic of blown glass. There are no very early "figured" glasses other than the bullion from crown glass until the advent of "Venetian," which seems to be at least a century old. It was made in the "muff" form before the making of sheet glass became general. The ornamentation obtained was simply a series of crude knobs and would ap-

pear to-day to be of value only as adding an apparent effect of heaviness to a small front. The Venetian, however, seems to have opened the way for the beautiful "Muffled" glass produced now for many years. This is undoubtedly one of the most useful glasses made, being obtainable in any color and of such a soft, even texture that it seems out of place in no combination, and in the case of the "Chance," or indefinite pattern, lends itself to any design.

It was noticed in a Continental factory, some years ago, that whenever water fell upon the hot glass in the blowing process and cracked it that if it was immediately reheated the cracks melted together, except on the surface where the pull of the working spread them into a sort of indefinite crackled pattern. This was elaborated upon until the whole sheet was produced bearing this pattern ("Crackled" glass). Some twenty-five years or so ago it attained a great vogue, but recently has fallen into disuse except in leaded work, where it is no particular matter if it is hard to keep the dust from lodging in the surface cracks. If exposed to the full weather it is very fragile. Its field seems now to be rather in straight glazing than in leaded lights, for its pattern, being so delightfully indefinite, can hardly be made to conform to any design. At the first production of crackled glass, workmen noticed that longitudinal markings upon the "ball" of molten glass were elaborated by the blowing process into a "flute" the full length of the sheet. This "flute" was improved upon by a mold which marked the sheet all round, producing the modern fluted glass, which it was noticed intensified the interior lighting wherever used. This led to an investigation that by various stages resulted in the modern prism glass now so generally used. When it is desired to have prismatic lighting set in designs the "fluted" glass is desirable, for the "flute" has recently been intensified, and with its smooth "fire-polished" surface gives the desired effect. Prism glass is now made with various angles of deflection, the chief concern of the architect being to get the angle that will deflect the light to the desired place. It is to be noted, too, that prism glass can now be had as large as 36 x 80 inches.

The illuminating engineer is, of course, responsible for the development of new prism glasses, as they are demanded by the ever-changing conditions of each new problem of sun—and artificial lighting. An interesting development in the science of illumination is the lighting of the great memorial hall in the new Soldiers' and Sailors' Memorial Building in Pittsburg. In this room it was the problem of the engineer to produce an evenly diffused and colorless light in all parts of the room. The solution consists in a double deflection of the rays of powerful electric bulbs in the ceiling panels through two thicknesses of a specially designed glass which the designer calls "Deflex." The lights are thus invisible, shedding a bright and soft luminous glow over the entire room.

Passing on to the subject of rolled glass, it is to be understood that there is no rolled glass whose surface is not more or less dulled and marked by the table and rollers used in its manufacture, and that it cannot be used wherever it is necessary to secure the maximum of interior lighting. Some, taking advantage of its poor light-conducting quality, have turned this into a thing of beauty.

Possibly the oldest and best-known rolled glass is what is now known as "Cathedral," being a plain rolled glass in colors, now made usually with a "hammered" surface, this being done to cover up the usual surface defects in rolled glass. Cathedral glasses seem to have developed from the original form of rolled sheet as mechanical means of handling larger sheets became known, until in its present form it is usually made in sheets 90 inches or so long. Most of the present American factories make Cathedral with a "hammered" back, though this does not prevail in Europe, the Germans, particularly, turning out a glass with a smooth surface, as do also the Scotch, whose colors also are of a pleasing texture. The American factories have recently been making smooth-faced Cathedral, but so far the surface has been scratched badly and is very far from being up to the standard

of the imported. The English double-rolled Cathedral, which is rolled with an extra roller while still plastic, is well known and much liked. Contrary to expectations, the double rolling seems to produce a smoother surface, supposedly, by preventing buckling, and also seems to produce greater density of texture. In skylight work it takes the glare out of the sunlight, letting through a very full, softly tinted light.

Rough plate glass in crystal finds a variety of uses in sidewalk lights and skylights, it being procurable in all thickness from ⅛ inch to 1 inch, and with plain or ribbed surface. Ribbed plate was the first attempt to roll glass with other than a smooth surface, but from this has grown a large class of glasses for various uses and in endless designs or patterns, such as the well-known "Florentine," "Colonial" and "Maze"; in this class of goods the Danes seem to excel, closely followed by the English. The principal application of these glasses is in partition work or workroom windows, and with so many designs to choose from it is generally possible to get a glass that will be in harmony with the room and its surroundings.

From the making of Cathedral glass in plain colors, the next development was the mixing of two colors, and finally three or even more in the sheet. In doing this, it was found that the introduction of an opal glass brought the other colors into relief and thus gave rise to the Opal Cathedral glass, so largely used a few years ago and still used where colored glass of this type is wanted in large lights. It can be furnished up to 30 x 90 inches in size, and in a variety and combination of colors, and is also rolled, if desired, with the rippled or Etruscan backs, thus adding to its beauty and usefulness. Opal glass is rolled also in all thicknesses, and is used for covering walls wherever absolute cleanliness is desired, and for such uses as icebox linings, bathroom tiling, shelves, clock faces and, of course, plate glass any thickness is made of it in any color, but its uses are limited.

An interesting and peculiarly American development is wire-glass, first produced at Tacony, Pa., in the early seventies. While its merit was quickly recognized, its manufacture presented so many difficulties that its first makers were glad to abandon it to others. Its manufacture was soon after revived under the Schmertz patents at Brownsville, Pa., with more success, though this plant also has disappeared, and the site is now traversed by the Pittsburg & Lake Erie Railroad tracks. Subsequently, a French company, which managed to procure American patents to make wire-glass, established a plant at Port Allegheny, Pa., in 1895, and this was operated successfully and merged with the companies owning other patents for making the same glass. Its merits were so apparent that it found instant favor in its special field as a fire retardant, until now its consumption is measured in millions of feet annually. Its uses are, of course, thoroughly understood, but it is only recently that it has been polished, and also now rolled with a pattern upon its face, rather obscuring the wire and adding to its decorative effect.

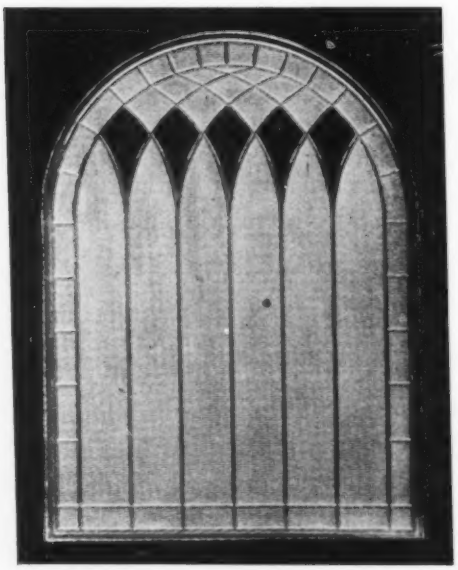
Inventors are now at work trying to make wire-glass from the molten mass without first casting it upon a table. If this becomes a reality, the cheapness of the process will make the application of unlimited wire glass in building construction.

Recently there has been placed upon the market by an American firm a line of fire-polished plates, that is, plate glass which is polished by the usual process upon one side, the other side being subjected to the fire of a series of gas jets while the plate is issuing from the rollers and subsequently. The result is a finish little inferior to fully polished plate, and very good indeed, by reason of its absolutely impervious surface, for hospital slabs and sanitary purposes. Rolled into patterns, illustrated herewith, it is finding a wide application in straight glazing when ordinary plate glass is considered too expensive.

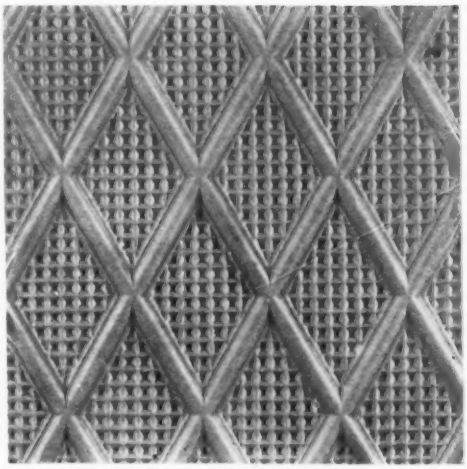
From time to time there has been discussion concerning the use of glass bricks in building construction. A few years ago a factory was equipped at

Bellaire, Ohio, to produce such bricks, but architects refused to take to the material on account of its higher first cost than clay, the heavy losses in transportation through breakage, and its tendency to craze or chip off on the surface. It was urged in favor of glass bricks that they could be produced in any color, and that, being hollow, they insulated buildings against extremes of temperature.

Pressed glass has been very little used in glazing, its most frequent applications being for jewels, plaques and in leaded combinations, the one exception being railway car deck-lights. For this purpose, being made and annealed in one piece to fit the size of the opening, its generous thickness successfully withstands shock under which ordinary glasses will break. In this connection, quite the most interesting recent development in glass-making is the production by an American firm of "Design Glass," similar to the illustration marked



Pressed Design for Window.

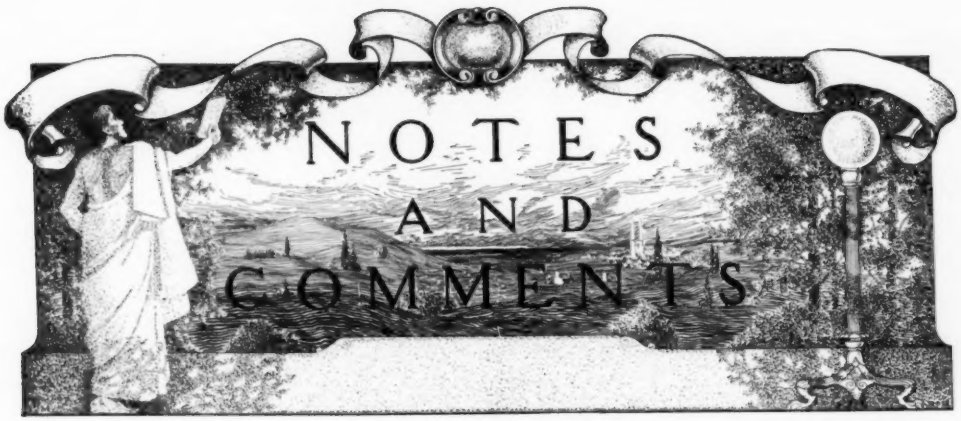


"Imperial Design."

"Imperial Design." Made first about two years or so ago, for decorative windows in Pullman cars, it opens an interesting field. Being pressed and annealed in one piece, it resists shock and can be readily cleaned, as there are no lead seams to catch dirt. It would seem especially applicable wherever a large number of lights of similar size and design can be used in a building, as in light walls and elevator shafts.

Of infinite use and variety is the American development of "Opalescent" glass, made first thirty-five years ago at the suggestion of Mr. John La Farge. Its use has grown until to-day there are seven American factories alone producing it, and while mostly for domestic consumption, large quantities are exported to all glass-using countries of the globe, for here, at least, America leads in glass. With several chemists and practical glass men working out the color problems, almost every conceivable shade and color combination of colors has been produced. Opalescent glass is, of course, primarily for the lead glazier, though it often finds its place in straight glazing.

Edgar H. Bostock.



THE NEW NEW YORK COURT HOUSE

A daily newspaper has something to say about what it calls the "appalling" architectural difficulty of the problem imposed by the new or rather the revived project of building the new New York Court House in City Hall Park. Of course there is no way of preventing an architect from being appalled by that or any other problem which may come to him in the course of the day's work. But one fails to see any occasion for panic. The problem has no undue complications.

Every patriotic New Yorker ought to be glad, at least, to see an end made of what for a full generation has been known as the "new" Court House. Architecturally, it is an incubus. Morally, it is a reminder of deep civic disgrace. When Leopold Eidlitz made his addition to it some twenty years after the original building, it is quite possible that he meant to point a moral by contrasting the reality and honesty of the new work with the pretentious sham of the old. At any rate he did point it, though the point has as much as possible been blunted by smearing over the honest brickwork of his interior with disguising paint. Fortunately, it was impossible thus to efface the stonework of the Surrogate's Court, which, by the way, was not designed for a court room at all. In any case the new work is all of any architectural value that there is in the disgraceful old pile. By all means let the old thing go, even if its going carries with it the real loss of the newer work of a different inspiration.

All the same, one has to admit that the problem has its complications, though they are calculated to "appal" the official authorities rather than the architect, and though they really ought not to appal anybody. The Hall of Records, on the other side of Chambers Street, is rather a melancholy object, in its present estate and environment, highly respectable as it is in itself. When the design of it was awarded to the late J. R. Thomas, that architect gleefully remarked that the award "meant ten million dollars' worth of work." It did seem so. What the architect meant, of course, was that this beginning involved three buildings, extending from Elm Street to Broadway on the north side of ChambersStreet, the Broadway end of the row being the counterpart of the first building, and the middle building predominant over both. No instructed person can look at the Hall of Records as it is without perceiving that it was designed as a "wing" of an architectural composition. A very impressive composition it might have become, comparable to those façades of Gabriel on the Place de la Concorde. That was the handsome thing for the city to do, to fill this block-front with monumental structures, to be well seen from the ample foreground of City Hall Park, when the unsightly old "new" Court House had once been demolished. The municipality ought to have afforded the great expense of acquiring the Stewart property and the intermediate land.

Since the city did not see its way to doing that, the present project is perhaps the next best thing. A fringe of municipal building along the south instead of the preferable north side of Chambers Street. But here come in the complications. Every owner and improver of realty in that immediate neighborhood has relied upon the city's keeping open City Hall Park. Quite true, the park is not the useful "lung" it was in the time of our grandfathers. It is not even what it was before Mr. Mullett, early in the seventies, was permitted to gobble the lower end of it for the post office. But the riparian

owners who have bought and built, upon the faith of the park's being kept open as a park, and have recognized that advantage in the price they paid, are entitled to equitable consideration. They have something like a moral "vested interest." The city cannot really, with decency, occupy the north end of the park with skyscrapers. The Broadway Chambers would probably be most injured by such a course. But many owners would be injured and would have an equitable grievance. Only fancy what a fluttering there would be in the realty dovecotes further down Broadway if Trinity Church were to announce its intention of removing Trinity and St. Paul's uptown, and opening the churchyards to secular "improvement." Yet in that case nobody would have a tangible grievance. The builders who have taken advantage of the air and light of the churchyards have made no compensation to the owners of those enclosures. They would have nothing to say, excepting that they had taken a chance which had gone against them. But the case is rather different when the city itself is the owner of property the "ancient lights" of which it proposes to shut up.

This is the main complication of the design of the new Court House. The building ought, in the interest of what is left of the park, to be as narrow a fringe as possible along its northern boundary. It ought also, in justice to the equitable claims of riparian owners, be kept as low as possible. It is by no means a case for skyscraping. The moderate height, say, of the Hall of Records ought not to be exceeded by the buildings opposite to it on the south side of Chambers Street. Nevertheless, and in spite of these two moral restrictions, the courts could without question be accommodated on that front without violating the restrictions. A comparatively low and comparatively narrow fringe of building along the north side of the park would be ample. If any architect is "appalled" by the prospect of designing such buildings, he ought to be excused, and his place taken by another who does not go in equal terror of a rare professional opportunity.

AN APPRECIATED ARCHITECTURAL EXHIBITION

In connection with the exhibition conducted by the Architectural League of the Pacific Coast this winter in Los Angeles there were several features of general interest apart from the mere fact of its size. And with its eleven or twelve hundred drawings it was the largest architectural exhibition that California has had. The opening was attended by some fifteen hundred invited guests, and throughout the attendance was very large—about 27,000, it is said. Admission was free, and the superintendent of the city schools sent a circular letter to the principals, requesting them to urge the pupils in the older classes to attend. But there were two special attractions: A large collection of city-etchings by Joseph Pennell, and the Blashfield collection of mural decoration exhibits which has been *en tour* in the West. Later, the Pennell etchings and some of the Blashfield collection were loaned to the High School, for its exhibition of pupils' art work. Altogether Los Angeles, and incidentally much of the Pacific coast, had, through the exhibition of the Architectural League, an artistic spree, the full delight of which cannot be readily appreciated in the East where such opportunities are not so rare; and the movement to bring the A. I. A. to the coast in convention received locally a strong impetus.

PUBLIC USE OF HISTORIC MANSIONS

Architectural discussion in Princeton during the winter has not had to do only with the proper site for the graduate school—though it was interestingly vigorous enough on that point; but it has found a fascinating subject in the town's new Borough hall and Thompson hall. These are a legacy to the community from Mrs. Josephine A. Thompson-Swann. Thompson hall, a historic mansion was given in trust to a self-perpetuating body that is to permit its use for public meetings and other civic purposes, to which end the former drawing room and dining room have been converted into an auditorium; and Borough hall, a stone structure, formerly the stable of the mansion, now made to face the street, remodeled and made suitable in aspect and convenience for town-office use without sacrifice of its Colonial virtues. This is an interesting civic development, finding parallel in the city hall of Yonkers and doubtless in a few other places. In Des Moines a historic old house, the Sherman mansion, has been turned over by the city to the woman's club—certainly a unique procedure; but, unfortunately, whatever its local historic associations, the structure itself is a relic of American architecture's saddest period, the black walnut days. As in the case, however, of the Princeton mansion, it it surrounded by considerable grounds which become a park.

NATIONAL CONFERENCE ON CITY PLANNING

Such was the success of the National Conference on City Planning and Congestion which was held last May in Washington, that a committee was there appointed to arrange for another conference this year. The committee has been working quietly on the project for a good while and has now issued a call for the Second National Conference, to be held in Rochester, N. Y., for two days, beginning April 4th. The hosts will be the Rochester Civic Improvement Committee and the Chamber of Commerce. The program committee, realizing that it would be folly to attempt to cover the whole vast subject of city planning in a two-day conference, has wisely selected a single phase of the subject for each of the six regular sessions, and this phase will be discussed by the leading authorities, to the end that the Conference may make a distinct and valuable contribution to those aspects of the subject which it touches. Opportunity will be given also for open discussion. The subjects selected are: The Problem of Congestion, its causes and some solutions; The Movement of Passengers and Freight in its relation to city planning; Street System Problems; and finally Methods of Procedure, to secure the carrying out of city plans when they are made. The Conference is open to all who care to attend, and the acceptances already received indicate a very impressive gathering.

BILL FOR A STATE ART COMMISSION

Under the chaperonage of Walter Gilman Page, a bill has been presented this winter to the Massachusetts legislature providing for the establishing of a State Art Commission. This is not the first time that there has been an attempt in Massachusetts to secure legislation of the kind, but the futility of the former efforts only makes the present the more interesting, for there naturally has been endeavor to avoid the mistakes of the past and profit by its experience. Also, there is evidenced the persistency of the desire. The bill extends to the State the principle of a municipal art commission. The members are to be appointed by the governor, by and with the consent of the Council, and are to serve without compensation. They are to be five in number, and an interesting innovation of the bill is that it does not specify the professional avocations of the appointees, leaving that to the discretion of the appointing power. It has been held that a serious practical objection to requiring that an architect, a painter, a sculptor, etc., shall be appointed, is that membership in the commission bars the member from taking part in competitions for State work and from accepting opportunities for artistic work for the State. By the terms of the bill, the commission would, on request, "act in an advisory capacity" relative to works of art acquired in any way by the Commonwealth, and relative to any building erected or remodeled by the Commonwealth, the term building including, by statement in the bill, "bridges, arches, gates, walls or other permanent structures of any character," as well as structures for human habitation and use. The bill explicitly states that the Metropolitan Park Commission, which is State-created, shall have the right to refer questions to the State Art Commission.

A LOOK BACK

In a reference the other day to a back issue of The Architectural Record, the eye was attracted by the beginning of a certain article other than the one sought. The article opened with these words: "There has appeared in the last three or four years a new and exceedingly interesting municipal movement. Its results, which seem very promising, will be watched with the keenest regard. There never has been anything exactly like it before, and its recent rapid spread suggests that its development is destined to go far." The issue was that of May, 1905,—not so very long ago as to excuse forgetfulness of the movement—and yet what could it have been, that then seemed so important and promising? The next paragraph explained. "Reference is made to the matter of securing expert plans for the physical improvement of cities;" and the article, proceeding, told of the work of this kind which had been done in eight cities in this country and in Canada. So it is not the movement, but its novelty, that has been forgotten. So firmly has it now been established, that one does not associate it with anything that was considered only five years ago as new and experimental; it seems already to belong with the things that are old and tried. And yet, it is only ten years

ago that the American Institute of Architects, meeting in Washington, passed those resolutions that prepared the way for the appointment, months later, of the experts who were to plan for the development of the capital city. The town-planning history has been making fast.

INJUSTICE OF OFF-HAND CRITICISM

As propriety requires that the pot should not call attention to the blackness of the kettle, so a seldom broken rule of journalistic etiquette restrains the expression of any difference of opinion between the departments of a newspaper. But so well bred a paper as the Boston "Transcript" has been led to violate the rule by the much discussed monument to Phillips Brooks. The column of the Clerk of the Day had ventured to make fun of the monument, and the urbane Listener, with his broader culture and gentler nature, takes him to task for it, calls him "incorrigible"—which is black, indeed; and says: "One can imagine that the shades of St. Gaudens and McKim—if artists soon after death revisit the earth to contemplate their works from their new point of view—would be a little startled to receive the whacks of a slap-stick, and this under the eaves of Trinity. 'Can't they bear in mind the Shaw monument?' McKim might comfortingly murmur to his companion; and St. Gaudens might answer in kind, 'Couldn't you be trusted to make a little thing like this? Didn't you head Richardson's young men in the building of Trinity itself, and didn't you build the Public Library?'" Then he imagines the shades leaping in New York—to New York from Boston!—to gaze with equanimity on the Farragut, with his sea-braced legs, and on the gay Diana-topped tower. But further on, and seriously, the Listener protests, and well, against the "off-hand journalistic criticism which would dispose, at sight, of a labor of seventeen years by one of the greatest sculptors of modern times." St. Gaudens, he notes, gave the best part of his mature life and of his triumphantly productive period to the modeling and remodeling of this monument; and adds: "As for the canopy, it is not possible that Mr. McKim, whose name is a synonym for the highest ideals and the best in art and architecture, has crowned his career with an architectural solecism." The protest closes with an extract from an editorial from the Architectural Review in which, in evidence of McKim's painstaking with detail, Bates Hall in the Boston Public Library is described as "unique among impressive monumental American interiors."

NEWS ITEMS FROM ROME

There is rather more than the usual promise of the interesting and unusual in the plans announced for the Exposition with which Rome is preparing to celebrate in 1911 the fiftieth anniversary of the proclamation of Italian unity, and her own rise to the dignity of a national capital. A brilliant committee has been created to take charge of the commemoration. The president is Count di San Martino, a patron of art, music and the drama; and one of the vice-presidents is the sculptor, Ferrari. Vittorio Pica, the art critic, is head of the fine arts section, which has an appropriation of $40,000 for prizes and of $100,000 for the purchase of exhibited art works. A writer in Le Figaro says of the exposition plans: "Behind the Pincio, on land lying between the Villa Borghese and the Villa Giulia, a magnificent palazzo is being built from plans by Cesare Bazzari. Around it are to be grouped the pavilions of the foreign countries. This fine group will shelter the exposition and will eventually become the modern museum of the Eternal City. As for architecture, generally so inadequately provided for on occasions of this sort, the committee has proposed two competitions. One is international, with three prizes—$30,000, $20,000, and $10,000—for the erection of completely equipped houses 'giving an exact and complete idea of the last thirty years' efforts in various countries to create, in the spirit of modern feeling, types of houses corresponding to the aesthetic aspirations and special requirements of the different people of our time as regards domestic architecture.' The other, a national competition, offers three awards of $20,000 each, one-fourth to the architect and three-fourths to the builder, 'for the creation of three types of modern houses, corresponding to the habits and living conditions of different social classes.' Novel points of view, n'est-ce pas?" Another architectural feature, also of more interest than harmony, is to be a series of pavilions near the Tiber, representing the provinces of Italy by a reproduction of the type of building characteristic of each. Thus a house from the Abruzzi

country may be cheek by jowl to a Genoese palace, and a Sicilian house to a fisherman's cottage from the Adriatic's shore. As to the street changes and widenings that are taking place, in urban preparation for the exposition, there is the usual criticism that Rome is being unduly modernized. A correspondent of Le Temps writes very bitterly on the subject. He speaks of it as the wave of destruction sweeping over the city, as a devastating cyclone that has burst upon Rome, as an invasion of architects and engineers to be likened to that of the barbarians. But when one comes to his concrete descriptions, the fault seems to be mainly in the scale of the new private construction which is going on. With the increased height of modern building, this is of course inevitable, if municipal building ordinances do not protect the piazzas and squares that were proportioned to the low structures of an earlier day. He speaks of the Piazza Barberini, where the white plume of the fountain has nodded so grandly. Now the broad Via del Tritone, which starts from it, is flanked with heavy seven-story houses that "offer all modern conveniences" and overwhelm "the fine aigrette." So in the Piazza Colonna, the little pink fountain and the little column of Marcus Aurelius are to have as background a monster building containing theaters, concert halls and moving picture shows. This is all horrible; but surely the fault is not with the widenings which are bringing other streets and squares into scale with modern buildings.

THE WORK ON WINCHESTER

A long article in London Truth, on the work of saving Winchester Cathedral, tells its story with such interest that one finds it most difficult to condense the account into a paragraph. And it is the more interesting because American money is paying in part for the improvement, subscriptions having been solicited in this country as well as in England some four or five years ago, when the work was undertaken. It seems that the Norman builders who, at the beginning of the twelfth century, laid the foundations of the cathedral's oldest portions, found a bed of peat about ten feet below the surface. Accordingly they laid trunks of trees on the peat, covering them with chalk and rubble, and built their walls on that. Nearly three hundred years later, when William of Wykeham reconstructed the nave, he tried to improve the situation by driving timber piles into the peat. This was all right, except that the piles were too short to reach the solid bed of gravel below. They have not rotted, but in the four hundred years they have been slowly sinking deeper into the peat, under their enormous load, and finally the moment came when the walls got so much out of perpendicular that, in spite of the excellence of mortar and masonry, they began to crack and the vaulting of the roof began to fall. Expert examination then showed that there was not even a day to spare. "Crutches" were immediately constructed, and the work of underpinning the foundations commenced. The bed of peat was found to underlie an underground watercourse or lake, and the trenches at once filled with water to its level. In order to get foundation to the underlying gravel, it was necessary to employ an ocean diver, and for five years this man has been doing the work single handed below the surface. He gets the peat and old timber from under the walls and then lays concrete upto the water level. Then the masons build up from the concrete to the old walls. Though the diver goes down only eight or ten feet, he has to do the whole of his work in the dark, guided only by his hands. He works six hours a day, in two or three hour shifts. The buttresses were found to be standing on soft peat which was absolutely incapable of supporting them, so that they practically hung to the walls, instead of supporting them—a pretty good proof of the cohesiveness of the masonry. Half a buttress is underpinned at a time, the weight being carried meanwhile on timbers. When the piers of masonry have been constructed under the buttresses, arches are built from one to the other to carry the intervening length of wall. The underpinning is now practically completed around the east end of the church and the transepts; the fissures in the walls have been filled with cement, and the vaulting has been reset where necessary. "No attempt has been made to restore the walls to the perpendicular, but the north and south walls have here and there been braced together by steel rods. The lofty south wall of the south transept is said to be nearly five feet out of the perpendicular, but the lean is not perceptible to the eye, and owing to the thickness of the wall its stability is not impaired when further movement is stopped, as it now is. The professional men are of opinion that when the whole work is completed, the church will be more secure than it has ever been." It is stated that the work has thus far cost £75,000 and that at least £25,000 more will be required. At present the funds are about exhausted.

EXHIBITION OF DOMESTIC ARCHITECTURE IN PHILADELPHIA

The T Square Club of Philadelphia, although fully appreciating the beneficial effect upon architects of frequent exchange of ideas, such as architectural exhibitions afford, feel that for this season their exhibition should be made of greater interest and benefit to the general public. Hitherto it has been the custom, in arranging architectural exhibitions, to include a large amount of material in which the laity had little or no interest, although it was, undoubtedly, of value in professional eyes. The coming exhibition will, instead, be one of domestic architecture only, as there are but few people to whom the subject of houses does not make a very potent appeal, this being perhaps especially true of country and suburban homes. It is aimed to have the exhibition thoroughly representative of the best in American domestic architecture, and, to make it a success, the hearty co-operation of architects who have made a special study of the various problems involved is, of course, essential.

SEATTLE ARCHITECTURAL CLUB EXHIBITION

The Seattle Architectural Club is planning to hold the Exhibition of the Architectural League of the Pacific Coast in Seattle, April 16-30. The gallery of the Washington State Art Association in the Public Library Building and a good portion of the second floor of the library itself will be used to house the large collection of drawings to be exhibited. The work is representative of over seventy-five architects in the Eastern and Pacific Coast cities. Of course, the largest part of the exhibition will be the work of the local offices.

This is the third of the four annual exhibitions planned by the League. The first was held in San Francisco in October, the second in Los Angeles the end of January, and the fourth will be in Portland early in June.

THE NEW SOUTH

The recent publication of considerable current work in the cities of the Southern States calls attention to the fact that the investment of Eastern and Western capital in that territory has been accompanied by a desire to house the people and industries in better constructed buildings, designed by architects in good standing, who are showing considerable skill in handling their problems. The architectural and technological schools of New York, Boston and the East have of recent years attracted many students from the South, and these graduates, after foreign travel and a practical schooling in the offices of older practitioners, have returned to their native land equipped to do excellent work. Add to this list capable men from New York, Chicago and Boston who have taken up practice in the South, locating there permanently, and there has been formed a group of men capable of exerting much beneficial influence in that territory. Many of the best and most interesting examples of our Colonial period still exist there in a good state of preservation, so that the term "awakening" is used advisedly with due credit to Thomas Jefferson and those of his time who introduced the Classical adaptation. The ravages of the rebellion and subsequent disorder played havoc with architecture as well as with nearly everything else in the South, and it is not until of very recent years that an "awakening" of business can be said to have taken place. The late H. H. Richardson, though a native of New Orleans, found but little encouragement for his activities in any of the Southern cities. The hotels in Florida, the more recent colleges, schools and churches, and most recently the office buildings and residences, have, however, opened a new era of development in Dixie.

On page 272 of the March issue the design of the Portland City Hall is erroneously credited to Carrère & Hastings and Calvin & Stevens as associated architects. The credit should read: Carrère & Hastings, John Calvin Stevens, John Howard Stevens, Associated Architects.